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AVIATION

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August 18, 1928 Issued Weekly PRICE 20 CENTS

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Action picture of an Alexander "Eaglerock" banking into a turn

VOLUME XXV

NUMBER 8

Special Features

The Crawford Metal Plane

Specifications of the Material

The Aero Corporation of California

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AVIATION PUBLISHING CORPORATION
250 WEST 57TH STREET, NEW YORK

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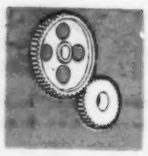

TIMING GEARS?

COUNTER WEIGHTS?

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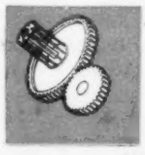

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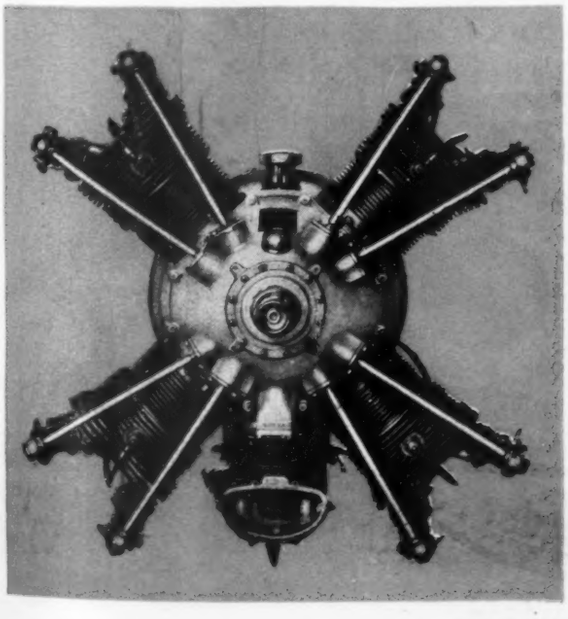

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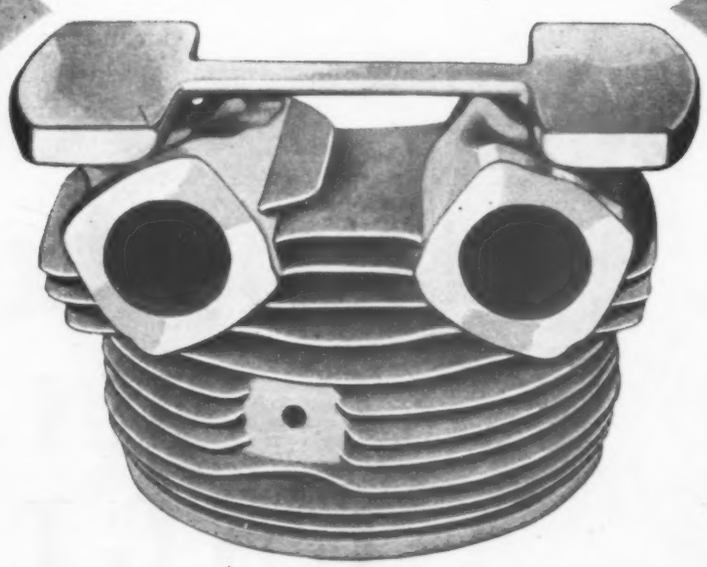

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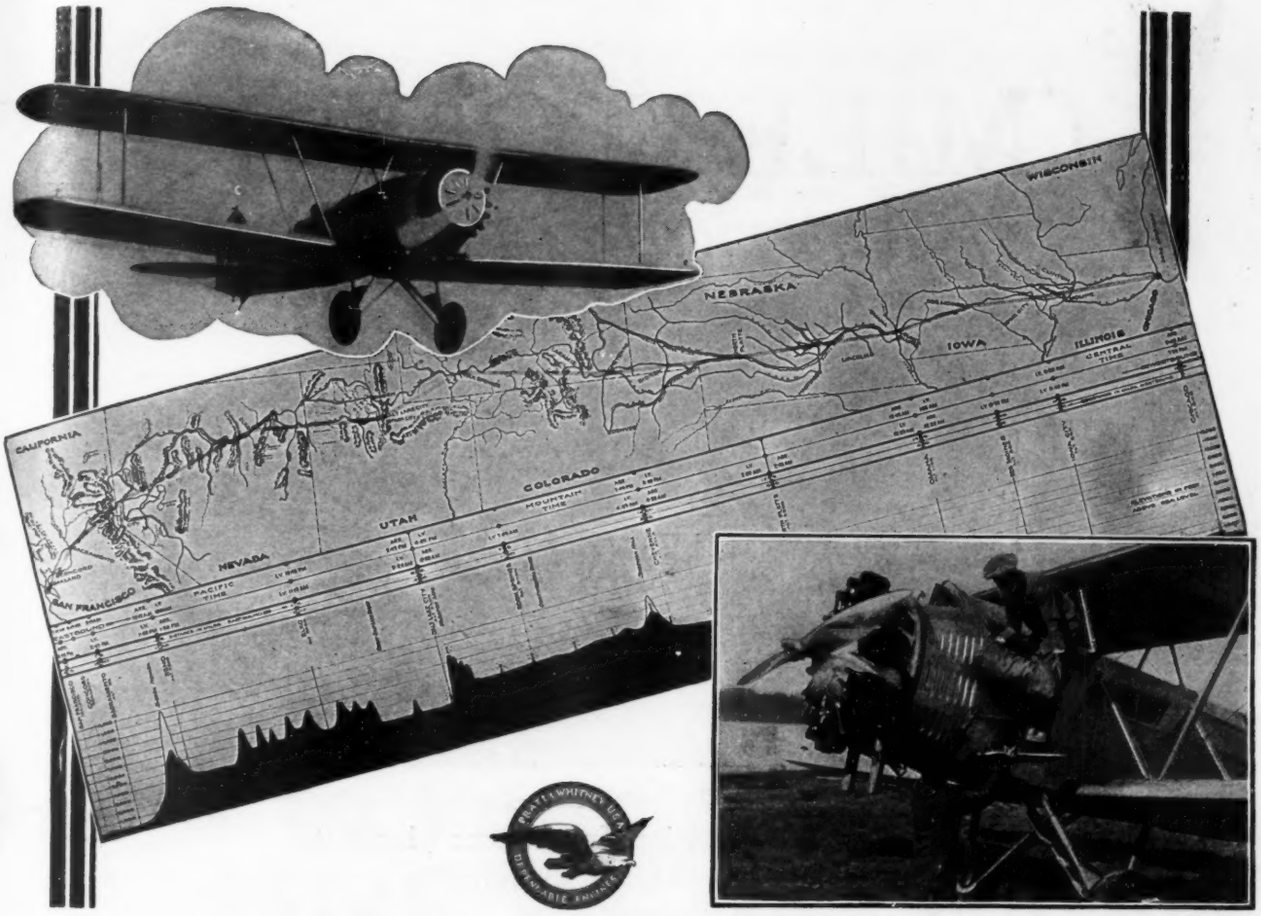

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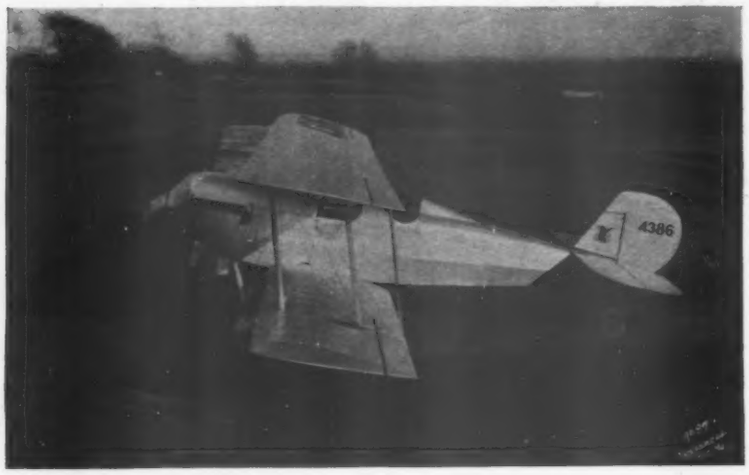

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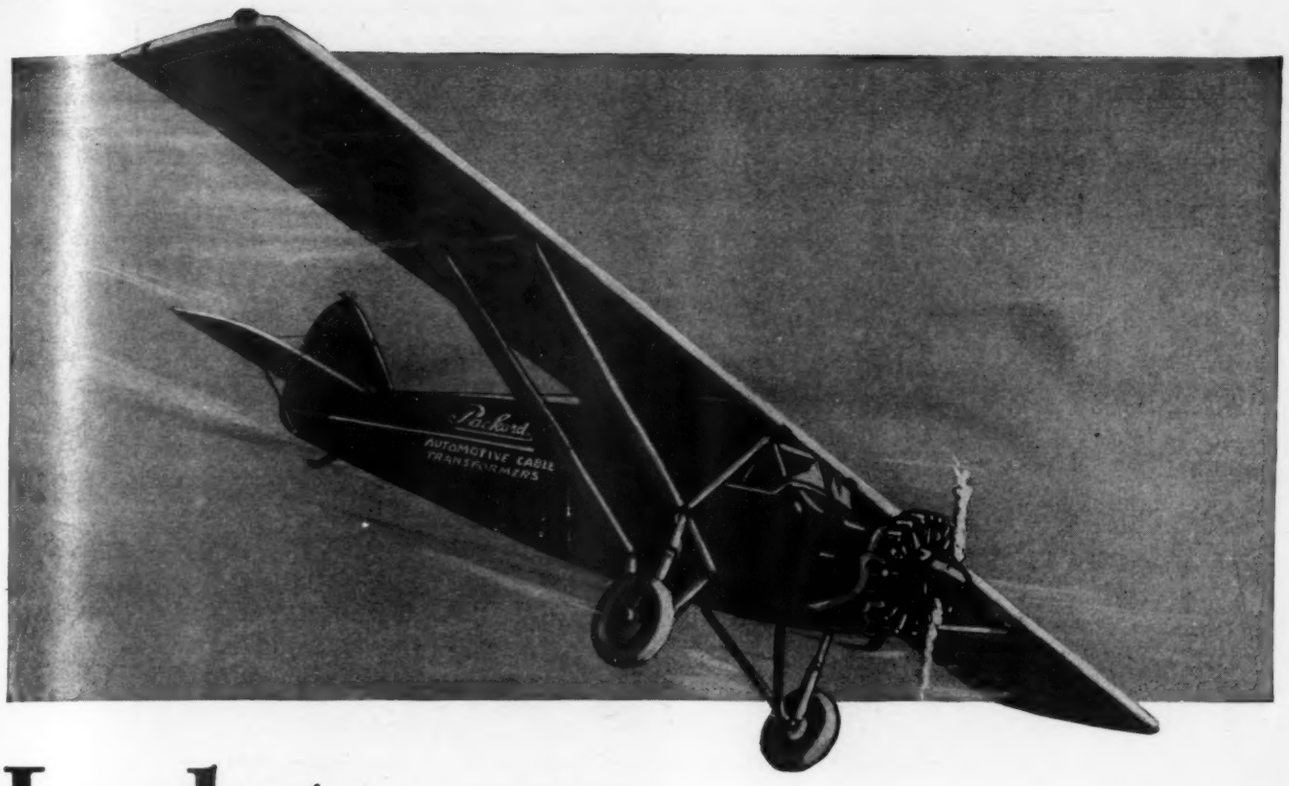

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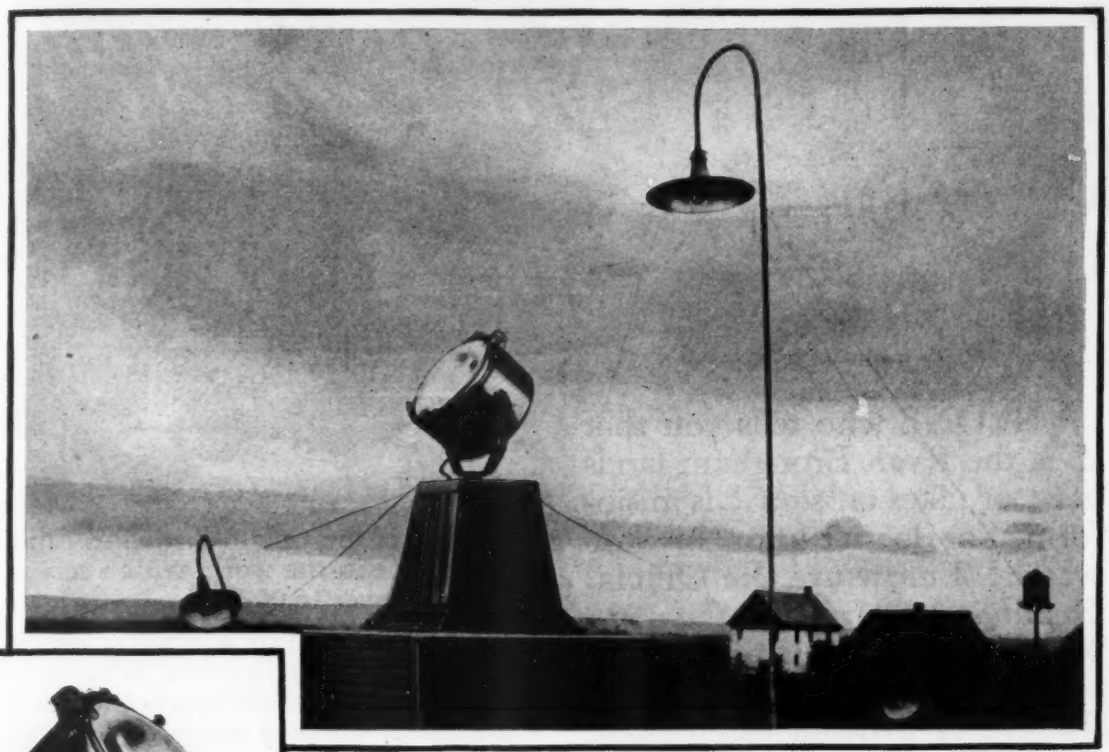

Type DCE14 Ceiling Projector

Ceiling Projectors Are Described and Listed in Bulletin 2108

FOR determining the height of the ceiling, the Crouse-Hinds Company makes two projectors, one having a 14-inch diameter reflector and a smaller one having an 11-inch diameter reflector. Both of these units are equipped with vanes or louvers to cut off the spill light. The 14-inch projector is made with a cast aluminum casing and the 11-inch diameter projector is made with a sheet metal case. Both projectors are weatherproof. Both of these units are equipped with two-way focusing mechanism. The 14-inch projector has peep sights for adjusting the lamp at the focal point of the reflector in the daytime. On the side of the projector there is a quadrant and pointer for raising the projectors to the desired angle of elevation and computing the ceiling height.

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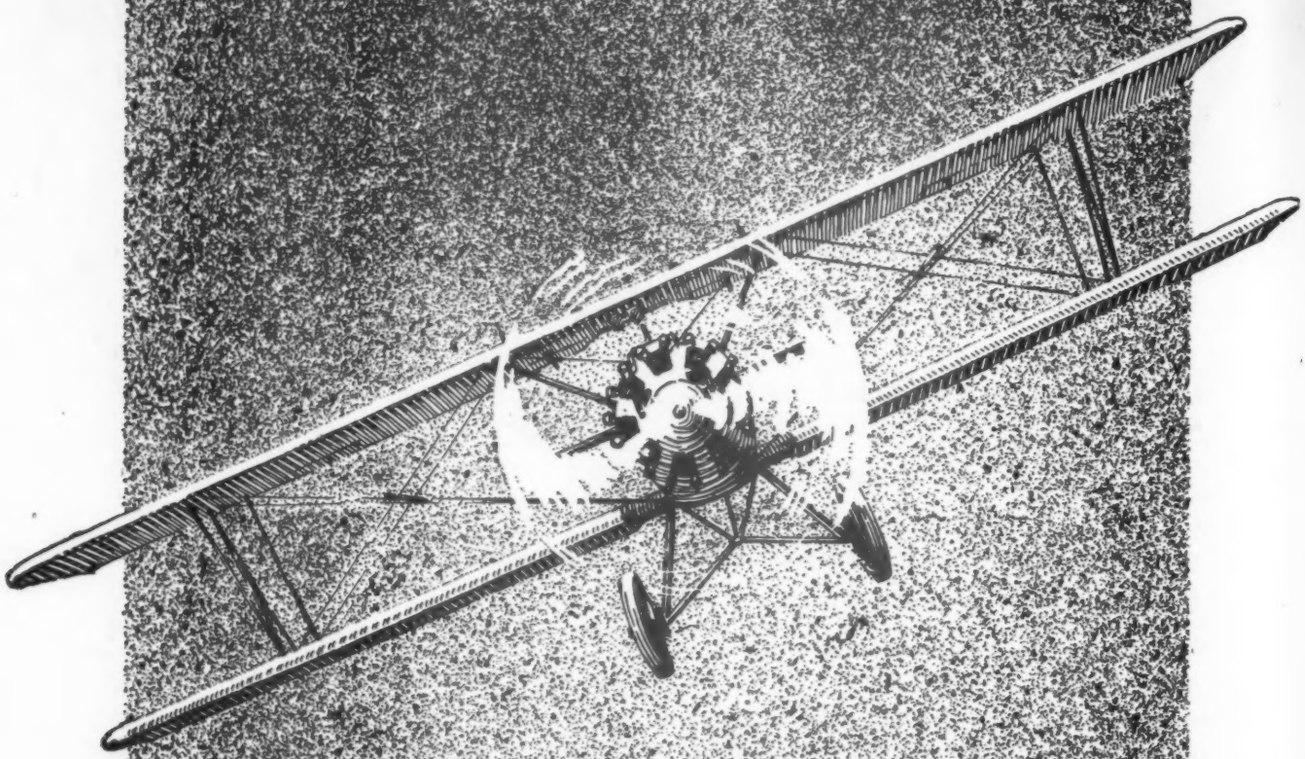

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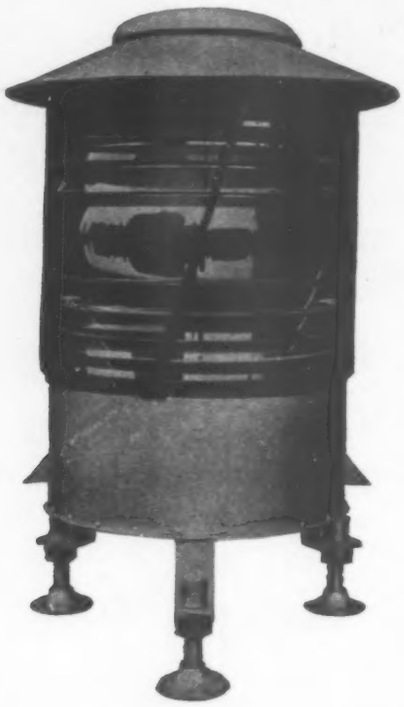

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AVIATION PUBLISHING CORPORATION
Business and Editorial Offices
250 West 57th Street, New York City
Cable Address: AEROENG

Publication Office: New York, New York

Subscription price: Four dollars per year. Canada, five dollars. Foreign, six dollars. Single current copies twenty cents. Back numbers, 25 cents. Advertising rates on application. Issued every Saturday. Forms close eight days previously. Entered as second class matter July 27, 1928, at the post office at N. Y., under the act of March 3, 1879. *Copyright 1928 by Aviation Pub. Corp.*

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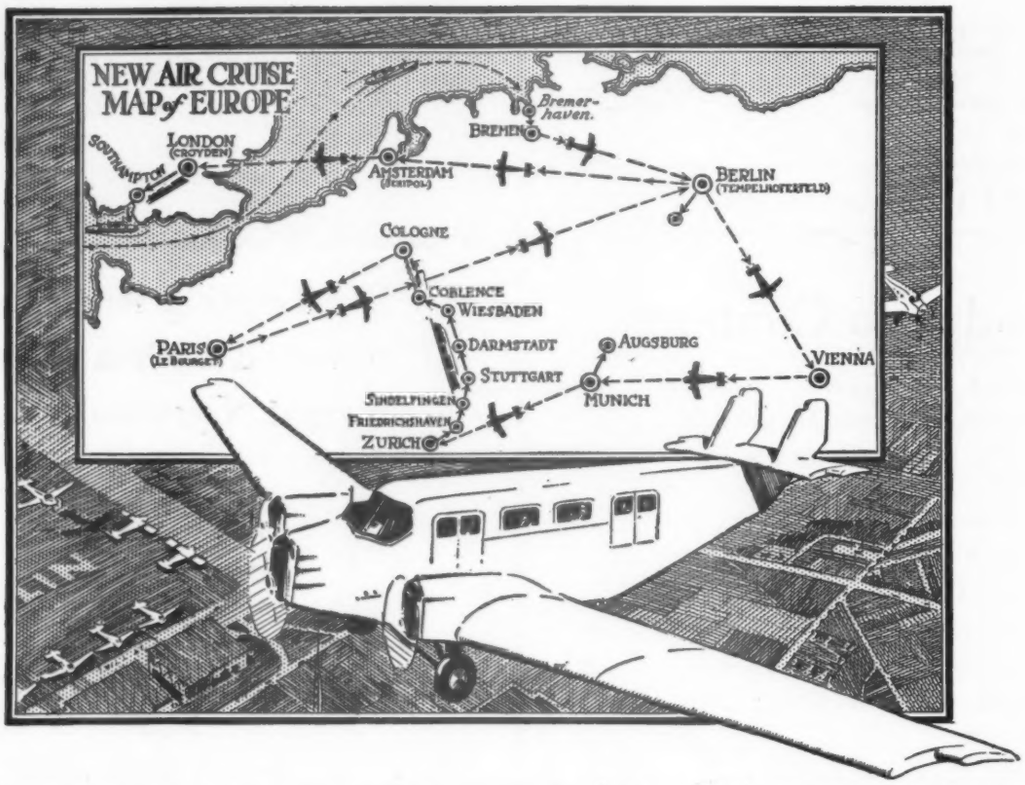

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AVIATION

The Oldest American Aeronautical Magazine

Vol. XXV ***AUGUST 18, 1928*** **No. 8**

Other Opinions

IN AN endeavor to ascertain the opinions of our readers regarding a most important subject the following editorial was printed in the July 16 issue of AVIATION.

ARE THEY WORTH WHILE?

The day when exhibition flights were the main stay of commercial aviation has gone forever but there is still the same need to attract passengers to flying fields. At many fields, especially the smaller ones, parachute jumps are advertised at regular intervals so as to draw the crowd. At most of the fields where business is well established, parachute jumping is discouraged if not actually forbidden, and there has been a considerable amount of talk about the Department of Commerce extending its regulations to practically prohibit exhibition jumps.

The question has many interesting angles and deserves a considerable amount of discussion, for it would not seem fair to regulate out of existence a branch of aeronautics, which in times past has played a very important part in the industry, without going into the matter pretty thoroughly. Personally, AVIATION *believes that wing walking and other stunts in connection with a flying field are not worth while but that parachute jumps by trained personnel with good equipment* ARE *worth while. We would, however, like to hear from others on the subject and would welcome letters from flying field operators and others.*

* * * * *

The following are extracts from two of the letters received.

Gentlemen:

"I am particularly in accord with AVIATION as outlined in the last half of the last paragraph of the editorial entitled "Are They Worth While?" Recently when the National Air Tour came through San Diego, I had an object lesson along these very lines. A good friend of mine who is spending a great amount of his time and finances in developing a well-known parachute company had arranged with three qualified jumpers to give exhibition jumps just before the National Air Tour planes left the field.

A ruling by the local Department of Commerce it seems prohibited making this jump. I went with my friend with the idea in mind of presenting some argument to the official of the local Department of Commerce so that he would alter his rule. He had left the field so my friend was put to some considerable expense and was unable to exhibit his merchandise before what I consider about twenty-five of the most prominent pilots in the United States.

"The parachute undoubtedly has its place and when exhibited with qualified and trained parachute jumpers, I can see no reason why regulations should not be provided which would allow its use."

Very truly yours,
(Signed) A. J. Edwards.

* * * * *

Gentlemen:

"We who make a living at parachute jumping feel that sooner or later we will be stopped. It has been pointed out to me that many jumpers do not know the first principle of packing or handling parachutes and also that many use old and obsolete parachutes. I will agree on those two points but I do not believe that we should all be classed the same and made to quit the work that we have done for years.

"We feel that a parachute in proper hands, properly folded, and in good condition is not dangerous. We also feel that our work requires considerable skill and is not a nerve demonstration. I, myself, have made over 1,000 leaps from balloons and airplanes in the past fifteen years without breaking a bone or meeting with a serious mishap.

"In the past ten years I have not lost a student or injured any of them, and I have educated several well-known jumpers who are at the game yet.

"We believe that much has been learned about parachutes through our work to improve and make the life saving equipment more simple. Many people come out to flying fields to see these jumps when they would not come just to see the planes fly.

"It has been pointed out to me that every fatality in the parachute jumping line was a detriment to aviation in general. I do not believe that over fifteen fatalities happened in the entire country during the run of the last season but I do believe that most of these were due to inexperienced jumpers and the rest to old and obsolete equipment. One instance was when the jumper left his chute in the air after his harness broke loose. Another was a boy, who, jumping for the first time, had the pilot chute caught in his legs and did not have the presence of mind to push it free. It is things like this that ruin the business for the men who have made it a life's study."

Yours very truly,
(Signed) J. J. Dunkel,
"The Flying Dutchman."

Specifications *of the* Material

By Edwin R. Douglas
Consulting Engineer

IN the form of organization described in the last article, which until recently has been almost universal, the foreman has held a key position. Upon him has often rested the burden of selecting raw materials, hiring and firing men, improving methods, planning production, deciding questions of technique and accuracy, making rules, enforcing discipline, reporting costs, and keeping such records as to him seemed desirable. In his own department, he has been a czar. To do all these things well requires a combination of technical and executive qualities that is beyond the range of most individuals.

Because of the limitations of human nature and the pressure of increasing production, it has been found necessary to simplify the foreman's duties, to provide him, through other sources and ahead of time, with the things he needs, and to allow him to concentrate on one thing —the operation of his department. This is not a curtailment of his authority. It is giving him service in those things where his authority is to be exercised, providing him with more exact information as to the What and How and Where and When, which it then becomes his duty to apply. The finding and supplying of this information becomes the job of the planning department, and it is issued in the form of production specifications.

Foreman's Careful Attention Impossible

An example will show how specialized production has become, and how difficult—indeed impossible—it is for a foreman, in the thick of departmental operation, to give careful attention to the advance planning. Take this typical case: A part has been designed by the engineering department and is shown in a properly dimensioned drawing. It is now desired to place this part in manufacture in the most advantageous way. Before this can be done intelligently certain steps must be taken. The probable requirements for it must be estimated; the sizes kinds, and needed amounts of raw materials must be determined and provided; the method of producing it must be decided and any special tooling provided. From the speeds of the machines and the recorded experience of the operating departments, the time required to perform each operation should be estimated; the most suitable quantities to be made at one time and the minimum figure to which the quantity on hand may be allowed to decrease before re-ordering should be settled.

It has not been unusual for four, five, or six of these things to be left by the management entirely to the discretion of the foreman—or to chance. But no foreman or superintendent, unassisted, can find time to determine these things for himself, for the orders he wishes to put in work, without subtracting seriously from the time available for direct management of his department. These things therefore go more or less unattended until troubles arise. Then production is delayed and costs go up. How much of this there is in the ordinary shop is often little realized by the management, or even by the foremen directly concerned; they are used to it. The foreman's function is too often interpreted as that of straightening out troubles, rather than that of so directing his men and their work that these troubles do not arise.

Production Specifications Should Be Detailed

How far the foreman can be relieved of these preproduction details by making their determination a routine duty of the planning department depends on the extent to which the product has been standardized. Where standardization is well advanced and quantities are large, the production-specifications which give this information may well be carried to considerable detail This would not be practical on a part subject to frequent change in design, or of which only a few are to be made. It is, however, often possible to extend its usefulness in these directions if the elementary operations are fairly well standardized, even though the product itself is subject to variations.

In the airplane, fortunately, the tendency will be strongly toward quantity manufacture and standardization; a condition in which it becomes highly economical to make the specifications full and complete. We shall therefore need to see what form this data should take to make it suitable for airplane production. Undoubtedly, there are many ways in which it can be transmitted to the man on the job. Some of these are better adapted to some industries and some to others. The form is not so important as the fact that the necessary information is given. However, there is here shown a sample of a form of specification, which has been found well suited to the airplane as well as to some other industries.

As actually used, the blank form is printed in hektograph ink and the special information is typed in with a hektograph ribbon, so that a considerable number of clear copies of each specification (50 or more) can be run off, using one of the gelatin-film duplicators.

If more convenient, the specifications may be prepared by blueprinting. The original is typed on thin bond paper with a sheet of carbon, face up, at the back, so as to give clear blueprinting qualities. Then, if adequate blueprinting facilities are at hand so that prints can be obtained promptly, it may not be necessary to carry any stock of the prints made up, but they may be ordered as needed. By either plan, such specifications are prepared for each part or sub-assembly entering into the complete plane or engine, and the sets of copies are filed in vertical folders according to specification-numbers.

These copies serve not only for reference bills of material and labor, but, when issued under production order numbers, are themselves the orders for production and the requisition for delivery of materials. For this reason, the quantities specified are those required to make that standard lot of each article which has been set as the standard manufacturing quota. When a production order is to be issued, several copies of the specification are taken from the file, or blueprinted, stamped with the next order number and dated, and are delivered as follows:

One to the storeroom, as instructions to get the material ready.

One to each of the departments which are to do the work.

One to the production department's current file.

One to the cost department, if current costs are to be kept on the job.

Before considering the uses made of these copies, it is well to examine, more carefully, the form and the information on it. This particular sample is made out for one of the sub-assemblies of the fuselage structure, a welded assemblage of steel tubes forming the rear halves of the two sides of the fuselage. It is for an airplane, model C-2. As the classified plan of numbering is used, (described in a previous article) the part-number of this sub-assembly, and of the specification covering it, is made up of the model number, C 2, the letter F meaning the fuselage, and the number 42, which is the distinctive number of this particular sub-assembly. So the full specification number is "C 2 F 42."

Two of these complete sub-assemblies, one right and one left, are used on each fuselage, and enough for ten fuselages are to be made on each order, so that the specification calls for materials and labor to make 20 sub-assemblies. These facts are all shown in the heading.

(*Continued on page* 562)

PRODUCTION ORDER TO Mr. ____ DEPT. ____ PRODUCTION ORDER No. ____

K. R. A. CO. FORM D 1

SPECIFICATION OF FUSELAGE MEMBERS

SIDE BOTH REAR SUB-ASSEMBLY

SHEET OF ____ | QUANTITY USED: C2 2 | 2 | DR END

DATE ____ BY ____ APPD. ____

SPECIFICATION NO. C2 F 42

OF DATE June 7, 1928

COVERS MATERIAL AND LABOR FOR 20 PARTS ON WHICH SCHEDULED TIME IS 30 hrs | SUPERSEDES SPEC. OF DATE ____

SPECIFICATION—COSTS: M ____ MB ____ L ____ LB ____ T ____

ITEM	STORES CLASS AND NO.	CUT	DESCRIPTION	NO. OF PIECES PER PART	NO. OF PIECES TOTAL	TOTAL QUANTITY MATERIAL		PRICE	VALUE	BURDEN
	MATERIAL									
a	1034 82 675	31	#102 Upper Center Long-	1	20	52'				
b	" " 655	57	#103 " Rear (eron	1	20	95' 3"				
c	" " 675	34	#105 Lower Center "	1	20	56'11"				
d	" " 655	116 ½	#106 " Rear "	1	20	194' 5"				
e	" " 615	23 ½	#111 Vertical Sta. 5	1	20	39'				
f	" " 615	19 ½	#112 " " 6	1	20	32' 9"				
g	" " 635	16	#113 " " 7	1	20	26' 11"				
h	" " 635	39	#134 Diagonal Sta. 4	1	20	65' 3"				
j	" " 635	37 ½	#135 " " 5	1	20	62' 9"				
k	" " 635	33	#136 " " 6	1	20	55' 3"				
l	" " 615	26	#137 " " 7	1	20	43' 7"				
m	" " 615	15	#156 " " 9-8	1	20	25' 3"				
p	1018 810		Welding Rod							
	LABOR									
a-1 b-1 c-1	802 Y	Cut	Hack Saw	See Cutting Chart						
a-2 b-2 c-2	"	Clamp in Jig	Screw Driver	Clamp Tight in Jig	.47	20	9.4	p 4		
d-1 1	"	Cut	Hack Saw	See Cutting Chart	.47	sets	9.4			
d-1 2	"	Fit	File Vise Jigs	Cut & Fit Tubeing at Proper Stations	.13		2.6			
g-1	"	Tack	Torch Jig	Tack d to 1 to a,b,&c	.13	20	2.6	p 4		
g-2	"	Remove from Jig	Screw Driver		.04	20	.8	p 4		
g-3	"	Weld	Torch	Around end of Tubeing	.83	20	16.6	p 4		
				TOTAL TIME			44.8			

MATERIAL REC. BY ____ DATE ____ COMPLETED ____ DATE ____

ITEM	SEE DRAWING	CLASS OF OPERATION	TOOLS	INSTRUCTIONS	STD. PROD.	NO. OF PIECES REQD.	TOTAL TIME EXPECTED	DEPT.	RATE	WAGES	BURDEN

HEADINGS FOR LABOR OPERATIONS ABOVE

Care *and* Maintenance *of* Siemens Engines

By T. Claude Ryan
President, Ryan Aeronautical Corp.

SIEMENS engines have been in service in American aircraft since January, 1927, and are used as standard or optional equipment in 15 makes of planes. A discussion of the care and operation of these engines is herewith presented.

The Siemens radial air-cooled airplane engines are built in five, seven and nine cylinder sizes. Each engine has a bore of 100 mm. (3.957 in.) and a stroke of 120 mm. (4.724 in.). All three sizes have dual magneto ignition. The five cylinder engine is provided with one carburetor, while the seven and nine cylinder engines are provided with two.

The crankcase of these engines is an aluminum alloy casting split on the center line of the cylinders. It is held together with through-bolts which give an extremely rigid mounting for the two-piece heavy duty crankshaft. With this very rigid construction, and the elimination of all babbitt lined bearings, it is unnecessary to split or disassemble the crankcase until after several hundred hours of service. The ball and roller bearing construction used is one of the principal features in the design of these engines.

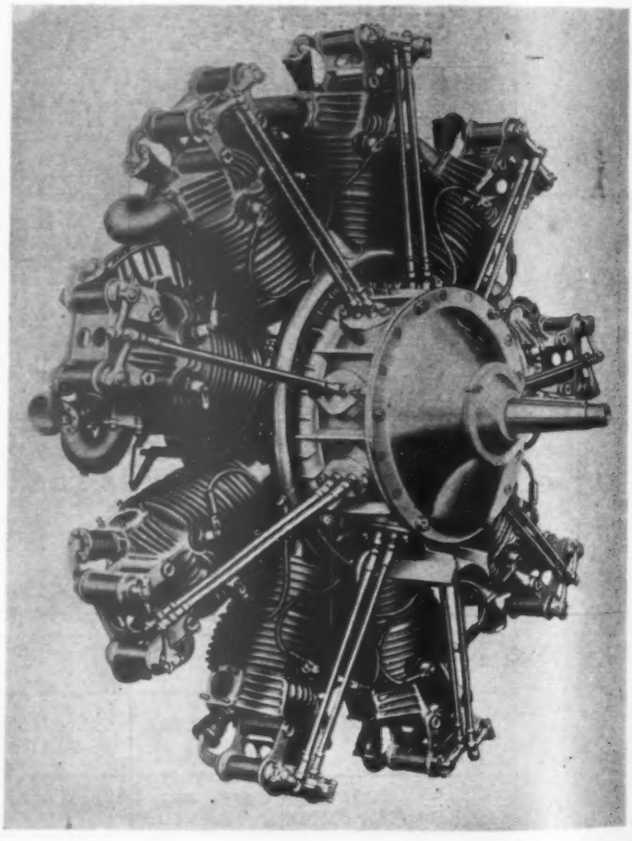
Carbureters Bolted to Manifold

The cam drum and valve tappet guides are located in the forward half of the crankcase. The circular induction manifold is located in the rear half of the crankcase. The carbureters are bolted to this circular manifold, and each cylinder in turn is connected to it with an induction pipe having an expansion joint, equipped with a rubber gasket to prevent air leaks and absorb the expansion and contraction of the cylinders.

The crankshaft is a high grade chrome nickel steel forging, fully machined and hollow drilled to eliminate all unnecessary weight. The counterbalance weights are attached by means of cross bolts and dowel pins. Naturally, the rear end of the crankshaft has to transmit a comparatively small amount of power and is correspondingly lighter in construction. The two halves of the crankshaft are connected by means of a long taper with a nut and dowel pin.

In designing this shaft every consideration was given to the development of a high-speed balanced crankshaft of the best quality, which would permit the use of a one-piece drop-forged master rod. The crankshaft is mounted entirely on ball and roller bearings. It has one small bronze bushing at the accessory drive end, utilized in conjunction with the oiling system, which will be mentioned later.

The connecting rods are of tubular shaped tempered steel, completely machined, and are very sturdy and exceedingly light. All connecting rods are subject to very careful tests. They must of necessity be of equal weight and have equal positions of equilibrium. The pistons are made of an aluminum alloy with bronze bushings cast in for the piston pin bosses. These bushings are grooved at the outer edges to hold the piston pin retaining lock rings, which permit the piston pin to float freely in both the piston and connecting rod. This arrangement gives exceptionally long life to piston pins and bearings.



Front quarter view of the Siemens nine cylinder aircooled engine.

The cylinders are of two-piece construction with an aluminum alloy head screwed on a steel journal sleeve, locked with a taper expansion wedge ring. This eliminates any possibility of gas leaks occurring around the threaded joint. The cylinder head also is equipped with bronze bushings for installation of spark plugs. Valve guides of conventional design are held in place by suit-

(*Continued on page* 554)

Crawford Metal Plane

A Parasol Type Monoplane With the Full Cantilever Junkers Wing and Powered With a 165 Hp. Gnome Engine

AN interesting experimental monoplane, said to be the first all metal airplane to be built in Southern California, has recently been completed by Harvey Crawford, well known Los Angeles aircraft designer.

Particular interest attaches to the performance of this plane because Mr. Crawford has not only attempted to adapt the German Junkers type of construction to the needs of American aircraft operators, but he has also designed his plane to use the Junkers wing mounted above instead of below the fuselage.

Has Experimental License X-5563

The completed plane, known as the Crawford Metal Plane No. 1, experimental license X-5563; is an all duralumin, two place, parasol type monoplane with full cantilever wing. Initial flight tests made from Dycer's Airport, Los Angeles, by Pilot Jimmy Angel, indicate a high speed of 148 m. p. h., climb at sea level of 1600 ft. per min., and a landing speed of 30 m. p. h. For these tests the plane was powered with a Gnome rotary engine of 165 hp. and carried no load other than pilot and 20 gal. of gasoline. The total useful load of this airplane has been estimated to be 1800 lb., and the absolute ceiling with full load as better than 20,000 ft.

The plane demonstrated both lateral and longitudinal stability in flight, returning to normal flying position from any angle without the use of the controls. One feature upon which the test pilot particularly remarked was the unusual stability of the plane and its ability to climb rapidly at low, angles of wing incidence. Some difficulty was experienced with the original landing gear, which employed shock cord wound directly around the axle, and this has been replaced by a Fokker type gear with an oleo strut extending up to the wing from each wheel.

The overall length of the plane is 24 ft. 9 in. The fuselage being of monocoque type, with all stresses carried by the corrugated duralumin covering which is 20 gauge in front of the pilot's cockpit and 22 gauge to the rear of the cockpit. Bulkheads are built in at approximately 26 in. intervals throughout the length of the fuselage. These bulkheads are of rectangular form and at each corner four thick pieces of 14 gauge duralumin have been riveted to the bulkhead and to the sheeting to keep the latter from tearing at the corners. The engine carries a rotary cowling which is faired into the rectangular form of the fuselage thus providing a certain degree of streamline effect, although not marked. A nine inch turtle deck is built along top of fuselage. The tail surfaces are all 26 gauge corrugated duralumin riveted to tubing. The floor of both cockpits is the duralumin sheeting which forms the under side of the fuselage.

Has a 34 *Ft. Tapered Wing*

The wing span is 34 ft. The wing tapers in plan form from 6 ft. 6 in. at the center to 3 ft. 3 in. at the tips, and in thickness from 13 in. at the center to 4 in. at the tips. Some dihedral is provided on the bottom of the wing due to the taper but the top is flat all the way across. The wing is mounted but four inches above the upper cowling of the passenger cockpit, somewhat decreasing the visibility on this plane. Access to the passenger compartment is obtained by means of a large door on the right hand side.

German Junkers practice has been followed in the internal structure of the wing which is of multi spar type with the drag and compression stresses carried largely in the covering. The corrugated duralumin sheeting which is employed for the wing covering varies from 20 gauge at the center to 26 gauge at the wing tips. This sheeting is riveted to the spars which are arranged five above and

(*Continued on page* 551)

***Front quarter view of the new Crawford Metal Plane No.* 1.**

The "Sign Carrier I"

Keystone Biplane Powered With One "Wasp" and Two "Whirlwinds" and Equipped for Night Advertising Work

THE Keystone Aircraft Corp., manufacturer of the Keystone transport biplane at Bristol, Pa., has completed a new plane, equipped to carry a large electrically illuminated sign for use in aerial advertising at night. The plane, which is known as "Sign Carrier I," was recently delivered to Aerial Advertising, Inc., of New York, and is now at Roosevelt Field, L. I., where it is undergoing a series of extremely rigid tests, carrying an illuminated sign that measures 90 ft. in length and 6 ft. 6 in. in height.

The letters used in formulating the advertising messages to be carried by the plane, are attached to the underside of the plane's lower wing and measure 6 ft. 6 in. in height. The tests conducted thus far at the Long Island field have proved that these letters may be read easily by persons on the ground when the plane is flying at an altitude of 3,000 ft. or under, and that they are visible at an altitude of three miles. This range of visibility makes it possible for the plane to fly over the most densely populated areas in its advertising work.

The Sign Carrier is similar to the Keystone transport biplane, "Pathfinder," which was used as a basis in designing the new plane. It does, however, embody a number of new features. The span of the Pathfinder's lower wing is only 75 ft. For the purposes of sign carrying, additional area was provided on the Sign Carrier, making the span 90 ft. The additional panels are bolted in position and are easily removed. To support the panels, diagonal struts from the outer edges to the upper joint of the main wing struts have been added. As a means of further increasing the strength of the wing structure to provide for the weight of the huge sign, the single bay of the Pathfinder has been discarded. For the "flying billboard," two intermediary struts have been added between the fuselage and the main struts on each side.

Wooden Strips to Hold Sign

Small strips of bass wood, measuring 2½ in. in width, are mounted on the underside of the lower wing. The letters of the signs carried by the plane will be secured to these strips. A portion of the cabin of the plane resembles a small electrical laboratory. There is a switchboard and work bench provided with protective bakelite panels. The electric power for illuminating the sign is obtained from six wind driven generators mounted on the wing. For safety, there are two independent lighting circuits. The wiring of each circuit is insulated and is led through conduits. Four conduits have been provided, and there are eight transformer box mountings with doors in each lower wing. Navigation and landing lights have been installed also.

While the plane was designed primarily for the purpose

(*Continued on page* 549)

Side view of the new Keystone biplane, "Sign Carrier I," built for Aerial Advertising, Inc.

The Aero Corporation of California

By CHARLES F. McREYNOLDS

ONE of the most significant airline operations in the United States is the Los Angeles—Phoenix—Tucson route which has been successfully flown by the Aero Corporation of California since November 28, 1927. This company has pioneered an undeveloped territory without the assistance of a mail contract or the prestige which such a service gives to passenger carrying. The Aero Corporation of California has sold no stock in this venture nor has it had available for operating experiments any reserve fund of money to carry the company over the first lean months of the service. As Lieut. Paul E. Richter, Jr., vice president of the company, stated, "The line has had to pay its own way from the start or be forced to suspend operations."

Support Reduces Passenger Rates

Public support of this airline was so great during the first three months of its operation as to make it possible to reduce passenger rates one third on March 1, 1928, and place them practically on a par with railroad fares between the cities served. This is an indication of the success that other well organized passenger carrying airlines throughout the country may expect.

Flying equipment on the Los Angeles-Tucson route consists of two Fokker Universal Wright engined monoplanes. The air-route is an east and west beeline between Los Angeles and Phoenix. There are numerous emergency landing fields but no night flying equipment, the three round trips weekly being flown in daylight. The distance between Los Angeles and Phoenix is 390 mi. by air as compared to 470 mi. by auto highway. From Phoenix to Tucson is 110 mi. by air and 202 by road. The time saving is at once apparent for it is only four hours by air from Phoenix to Los Angeles. The same trip by auto with all the attendant inconveniences of heat, dust and discomfort takes 16 hr., and by train the time is 14 hr.

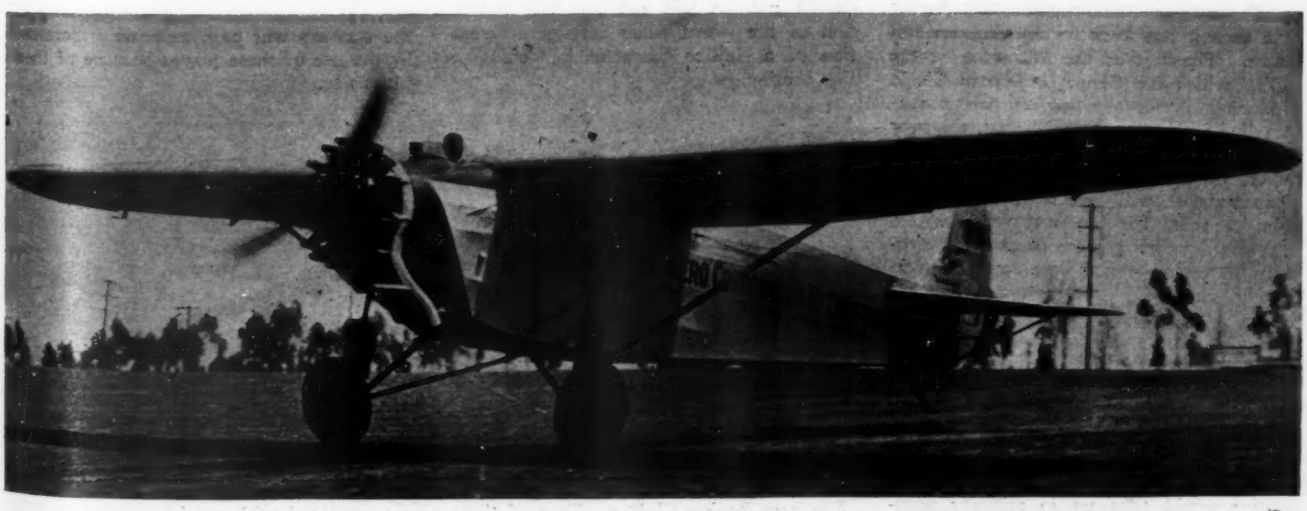
The scenic interest on this route is unparalleled from the standpoint of variety, the planes from Los Angeles passing over many principal Southern California cities, thousands of acres of orange groves, across the San Jacinto Mts., Palm Springs, which is a famous winter resort, Salton Sea which is below sea level, the Colorado river, San Gorgonio Pass, Salt River Valley and many other points of unusual interest.

Maintain Six Hour Schedule

The Los Angeles plane leaves at 10:00 A.M. on Monday, Wednesday, and Friday, arriving in Phoenix 4 hr. 20 min. later. A stop of 15 min. is made at Phoenix after which a flight of 1 hr. 25 min. places the plane in Tucson. Planes leave Tucson for Los Angeles on alternate days, starting at 8:00 A.M. Flying over this route is done by Lieuts., Jack Frye and Paul E. Richter, Jr. and Pilot Lee Willey to whom most of the flying is entrusted. The maximum altitude necessary for safety is only 2000 ft. which greatly simplifies operating problems.

Although the present equipment consists of the single

(*Continued on page* 548)



One of the Fokker Universals operated by Aero Corporation of California about to take off.

Government to Withhold Data on Service Airplanes

Performance Figures of the New Planes to Go On "Secret List" for a Year

WASHINGTON, D. C.—It is reported that official notice will soon be served by the Government on the American aircraft industry, particularly those firms specializing in contracts for military and naval planes and engines, of the establishment of a "secret list" upon which all new "battle planes" will be placed for the period of one year.

The existence of the aircraft on the "secret list" obviously cannot be concealed and no attempt will be made to shut it off from the public view, but the performance data and the crafts' specifications will be held in confidence for 12 months from the date the new plane is produced.

As far as can be learned from the Army and Navy in Washington, photographs of new planes both experimental and just out of the factory in a production status, will not be denied publication. Neither will a general description, which might be printed to the effect that such-and-such a plane has a top speed of "about" 150 m.p.h. a landing speed of "about" 50 m.p.h. the approximate cruising speed, the number of persons or the crew, and the load.

The "secret list" order, as soon as it has sufficient time to circulate will, if not already has, prevent publication of detailed data as to performance, design, and construction of airplanes like the Martin "74," or the T4M-1 as it is known in the Navy; the XF4B, the new Boeing fighter which the Army and Navy are watching closely during its rigid service tests at the Naval Air Station, Anacostia; the new Wright "V" type 12 cylinder air cooled engine of 500 h.p. which is to go in Army Loening Amphibians; the Curtiss "Chieftain" 12 cylinder air cooled engine; the Curtis "Condor," and the Keystone "Panther," both bombers and now in production.

Martin "74" to Go on List

The Martin "74" has been "out in the open" for more than a year, but during that time it has been on an experimental status. The first of the 102 order of the "74's," which the Glenn L. Martin Co. is producing, is due to come off the production line very shortly and be turned over to the Navy, whereupon under the new policy, its performance, specifications, and characteristics, will be confidential government property for the next year.

When foreign powers began to withhold performance and specification information they did not assume that the United States would continue to be liberal with data on its developments. The first nation that became reticent on the subject, knew that as soon as its viewpoint was learned elsewhere, a general reluctance to give information would spread.

The United States, it is learned, never felt that drawings of its planes in the service would turn up in military aeronautical organizations abroad because it is averse to duplicating foreign planes for the defense of the country over here. But performance figures are of value to both sides as they enable a close check of the native equipment with the competitor and should the latter have the advantage, means usually are found to correct the difference between the two. Such help could be obtained from the detailed specifications of the plane.

Engine Duplication Difficult

It is stated in Army and Navy circles in Washington that if the blueprints of America's newest engine designed for military and naval planes were given a foreign power; and if that engine represented the peak of design and construction for years to come, it could not be built in the foreign country and installed in an airplane for flight before the expiration of a year from the date the drawings were received. An airplane, however, could be produced in half or even less time, but those identified with the nation's aerial defense do not contemplate the production or reproduction aboard of American equipment as it exists here.

It is felt in Washington that the product of America's aeronautical minds should not be laid out for the inspection of the world when foreign information of a similar character is lacking in the foreign press.

Boeing Develops Lightest Fighter

One Place Navy Plane Weighs 1,600 lb. with Special Wasp Engine

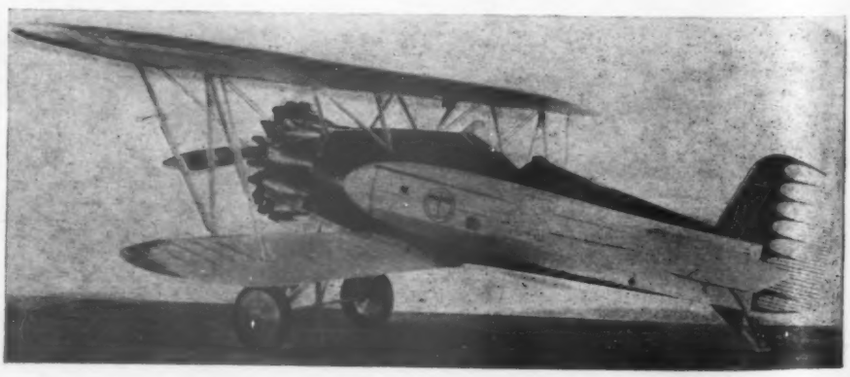
SEATTLE, WASH.—What is probably the smallest and lightest fighter in the history of naval aviation is the No. 89 single place biplane developed by the Boeing Airplane Co. Two of the planes have been delivered and the model has been designated F4B by the Navy Department. The first planes are equipped with special experimental type Pratt & Whitney Wasp engines, developing 500 hp. at 2100 r.p.m. A maximum output of 625 hp. is obtained at high altitudes when this engine is equipped with a supercharger.

The Boeing No. 89 has a wing spread of 30 ft. and an overall length of 20 ft. 3 in. In both of these dimensions it is approximately six ft. less than the earlier model of this type. The weight of the plane empty is 1600 lb. and the useful load 800 lb. It has attained a high speed of 182 m.p.h. and climbed to an altitude of 18,000 ft. in 10 min. in official tests. It has a ceiling of 30,000 ft. The landing speed has not been announced but is said to be low.

Engine Well Streamlined

All of the control surfaces are constructed of duralumin and these surfaces are corrugated for greater strength. The fuselage is narrow and less bulky than the usual type of fighter. The fuselage covering is projected between the cylinders and rounded in front of the engine producing the effect of the engine being built into the fuselage. This provides streamlining for the clyinders. Wings are of conventional wood and fabric construction and are externally braced by N-type interplane struts.

The Boeing No. 89 has been designed primarily to operate from the naval airplane carriers in fighting and light bombing. It is estimated that the capacity of the carriers will be considerably increased by the use of these planes because of their small size.



The new Boeing Fighter. Two of these planes, equipped with special "Wasp" engines, have been delivered to the Navy.

Minnesota Firms In Consolidation

Northern Aeronautics, Inc., Formed by Merger of Three Minneapolis Companies

MINNEAPOLIS, MINN. — Announcement has been made of the consolidation of three local airplane companies under the name, Northern Aeronautics, Inc., and of the formation of a fourth company, known as Northern Airlines, Inc., which will operate the several passenger airlines of the new company radiating from Minneapolis.

Northern Aeronautics, which is affiliated with the Universal Airlines System, is composed of the Mid-Plane Transit Co., Air Transportation, Inc., and the Northrup Airplane Co. Each of the companies will retain its identity and will act as a distributor for the various makes of planes already handled by them.

Passenger lines now operated by Northern Airlines include the Twin Cities to Chicago run, opened July 30, the Twin Cities to Fargo, N. D., run, in operation for several months, and the Twin Cities to Duluth line is oper- August 10. The Duluth line is operated from Lake Calhoun in Minneapolis to the mouth of the St. Louis river at Lake Superior in Duluth, pontoon-equipped Fairchild planes being used.

Other airlines will be opened in the near future, it has been announced, including lines from Minneapolis to Winnipeg, Cheyenne, Wyo., Kansas City, St. Louis, and Seattle, Wash.

Burtt Heads Kansas City Aviation Bureau

KANSAS CITY, MO.—In an endeavor to establish Kansas City as an aviation center, the Chamber of Commerce, through its special industrial expansion committee, which has $2,500,000 to spend in the next five years, has established a bureau of aviation. Robert M. Burtt has been placed in charge.

Mr. Burtt is 33 years old. In the World War he was a first lieutenant in the 28th pursuit squadron. While attending the Massachusetts Institute of Technology and Columbia University Mr. Burtt was a member of the air service of the national guard. He also was president of an aeronautical society at Columbia.

Hartford Company Sold

HARTFORD, CONN. — The New England Aircraft Corp. of Hartford, has been discontinued and its interests sold to the New England Flying Service Co.

Type Certificate Awards to 54

WASHINGTON, D. C.—Approved type certificates have lately been granted to plane models from No. 45 through No. 54, with No. 48 pending. The numbers and models are as follows: 45. Texas Aero Corp., Temple single place open land monoplane, Wright Whirlwind; 46. Buhl Aircraft Co., CA-3ɔ three place cabin land biplane, Wright Whirlwind; 47. Bellanca Aircraft Corp., CH eight place cabin land monoplane, Wright Whirlwind; 48. Pending; 49. Lockheed Aircraft Co. Vega five place cabin land monoplane, Wright Whirlwind; 50. Swallow Airplane Mfg. Co., three place open land biplane, Hisso 150-180; 51. Swallow Airplane Mfg. Co., three place open land biplane, Wright Whirlwind. 52. Atlantic Aircraft Corp., Super Universal cantilever monoplane, Pratt & Whitney Wasp; 53. Arkansas Aircraft Corp., 3-C-3 Command-Aire three place open land biplane, OX-5, OXX-6; 54. Boeing Airplane Co. 40C five place cabin land biplane, Pratt & Whitney Wasp.

Des Moines Company Delivers First Plane

DES MOINES, IOWA.—The first Des Moines built airplane to be sold and delivered took off from the municipal airport recently for Chicago, piloted by Captain J. C. Bryan, Chicago, Illinois. Captain Bryan delivered the plane—a "Whitey" Sport, two place monoplane, manufactured by Whites Aircraft, to Willard C. Vining, White Plains, N. Y. Mr. Vining purchased the craft for pleasure flying and will fly it from Chicago to White Plains.

During the trial flights over the local airport Captain Bryan succeeded in attaining an altitude of 12,500 ft. with Mr. Vining's plane. It is powered with a Szekely 3 cylinder SR-3 air cooled engine.

Kari-Keen Coupe Produced

SIOUX CITY, IA.—As a climax to recent activities here, the new Kari-Keen Coupe two place cabin monoplane was christened "Miss Iowa" by Ethel Mae Frette of Des Moines, recently named as "Miss Iowa." This is the first plane produced by the Kari-Keen Aircraft, Inc. Swen Swanson, designer, and Cedric Hoskins, chief pilot of the company, demonstrated the plane to the visitors at the field.

Verville Company Will Build Planes

Pioneer Aeronaut is Secretary and Chief Engineer of New Organization

DETROIT, MICH.—Alfred V. Verville, of Detroit, internationally known airplane designer and engineer, has been made secretary and chief engineer of the Verville Aircraft Co. a new aircraft manufacturing concern in Detroit, it was announced here recently by B. F. Everitt, veteran automobile manufacturer, who will be president and general manager of the new company. The Verville Aircraft Co. will occupy property formerly occupied by the Rickenbacker Motor Co. on Detroit's east side, and plans to build small, low-priced land planes and flying boats.

Detroit's Largest Plane Factory

With 300,000 sq. ft. of floor space the Verville Aircraft Co. will have the largest airplane manufacturing plant in Detroit, and one of the largest in the United States.

Details of the new company's products and their selling price will be announced within 90 days, it was said, at which time the first two models are expected to be completed and test flown. It was announced, that Verville designed and was in charge of the engineering work on both craft.

Besides Mr. Verville and Mr. Everitt officers of the company are: James Goudie, vice president, and Harry Griffiths, treasurer.

Verville Began wiith Curtiss

Everitt has been identified with the automobile industry since that industry's early days. Verville, active in the aircraft industry since 1914, at which time he started with the Curtiss company at Hammondsport, designed the first flying boat built in Detroit after organizing the General Aeroplane Co. in 1915. He served in the engineering department of the Army Air Corps during the World War, and designed several of the government's most efficient fighting planes.

The Sperry Messenger, one of the first light planes built in the United States, was designed by Mr. Verville. For eight years he was in charge of racing and pursuit ship designs for the government and served on the General William Mitchell and Lockhart Aviation Missions to Europe.

Briggs Company Obtained Property

The Rickenbacker property was purchased for the Verville interests by the Briggs Commercial and Development Co. of Detroit.

Boeing Transport Plane Completed

Quantity Production Soon to Start on 12 Passenger Cabin Biplane

SEATTLE, WASH.—The first of the new Boeing transport planes has been completed and is now undergoing tests here. It is a 12-passenger cabin biplane powered with three Pratt & Whitney Wasp engines, each developing 400 hp. at 1900 r.p.m. and providing a total of 1,200 hp.

The Boeing transport is said to be the largest plane ever built for quantity production on the Pacific Coast. It has a wing span of 80 ft., an overall length of 56 ft., and an overall height of 14 ft., 8 in. The weight of this plane fully loaded is eight tons. Besides the pilots, passengers and supplies it is capable of carrying 2,000 lbs. of mail, baggage and express matter.

The plane is a two-bay design with inner interplane struts providing supports for the outboard engines. The cabin is built into the fuselage with a roomy pilots' compartment in the forward and situated in such a way as to afford excellent visibility ahead for the pilots.

Planes of this type may be used in the new coast-to-coast air rail service and it is expected that Col. Charles Lindbergh will make a test flight in the first model in the near future, according to Chester W. Cuthell, general consul for Transcontinental Air Transport, Inc., for which Colonel Lindbergh has been made technical consultant.

In discussing this matter with Seattle Chamber of Commerce officials Mr. Cuthell said: "I have looked over Mr. Boeing's new passenger plane and I have arranged to have Colonel Lindbergh make a test flight in it with the idea of considering it for the fleet of Transcontinental Air Transport, Inc."

Super Mailwing Tested

BRYN ATHYN, PA.—Built to answer a need for mail planes of greater volume, a new Pitcairn Super-Mailwing, with a double capacity for air mail letters, made 127 m. p. h. over a measured course here recently. In a series of tests, including vertical banks, loops, spins, rolls and other gymnastics, the new plane, which is powered by a Wright Whirlwind, demonstrated great maneuverability.

Berliner Cockpit Width

In an article describing the Berliner monoplane, which appeared in the issue of July 21, it was erroneously stated that the passenger cockpit of this plane measures 29 in. in width. The Berliner Aircraft Corp., manufacturer of the Berliner monoplane, with headquarters at Alexandria, Va., has informed us that the passenger cockpit is 39 in. in width .

Collyer Touring U. S. in Fairchild

NEW YORK, N. Y.—A nation-wide good-will tour of principal cities and airports in the United States was started recently by Capt. Charles B. D. Collyer in his famous Fairchild monoplane, City of New York The plane, with Captain Collyer as pilot, and John Henry Mears as passenger, recently completed a 20,000 mi. journey by airplane and steamer completely around the world in the record time of twenty-three days and fourteen hrs.

The present tour is expected to last a month, following which Captain Collyer will enter his plane in the forthcoming New York to Los Angeles air classic. A. A. Woodruff, sales manager of the Fairchild Aviation Corp. will accompany Captain Collyer during the greater part of the cross-country good-will tour.

Lindbergh Named for National Committee

WASHINGTON, D. C.—Col. Charles A. Lindbergh has been formally summoned by the Government to give it the benefit of his knowledge of air navigation. He will be adviser as a member of the newly-created Standing Committee on Problems of Aerial Navigation formed by the National Advisory Committee of Aeronautics on recommendation of the executive committee at a recent meeting and which recently held its first meeting at the headquarters of the National Committee in the Navy Building.

Dr. Joseph S. Ames, provost of Johns Hopkins University and chairman of the National Advisory Committee, heads the new standing committee and he tendered the appointment to Colonel Lindbergh. The other members of the new standing committee are: Dr. Charles F. Marvin, chief of the United States Weather Bureau; Maj. Clarence M. Young, director of Aeronautics of the Department of Commerce; Dr. L. J. Briggs, of the Bureau of Standards; Dr. Jerome C. Hunsacker, of the American Telephone & Telegraph Co., and Paul Henderson, vice-president and general manager of National Air Transport, Inc.

New Company in Baltimore

BALTIMORE, Md.—The Doyle Aircraft Corp., was organized here recently to manufacture a light airplane on a production basis. The first plane is now under construction and is soon to be test flown. Officers of the corporation are: Harvey Doyle, president; Allan C. Davis, vice-president; Donald L. Primrose, secretary, and Wilson K. Doyle, treasurer.

Florida Waco Dealers In Meeting at Orlando

ORLANDO, FLA.—The Florida Waco Dealers Association held an informal meeting at the commercial field here recently. Dealers from various parts of the state flew to the gathering, many of them accompanied by students.

A number of air enthusiasts and several prospective Waco buyers were on hand to view the service planes and the carload of new 10's partly assembled at the hangar.

Certain advertising plans were considered and a uniform price for new planes was established. At the meeting it was decided that this standard price, delivered anywhere in the state ready to fly, should include teaching the purchaser to fly.

The group of Advance Aircraft Co. representatives

Stunts were performed for the benefit of "Variety," a central Florida news reel which covered the meeting and Ben T. Jones, Coral Gables dealer, led a practice formation flight in preparation for the Municipal Airport opening exercises October 4 and 5, which all dealers expect to attend.

Yale to Hold College Air Club Conference

NEW HAVEN, CONN.—As part of the general movement to further college aviation an intelcollegiate aviation conference will be held October 19-20 at Yale University, under the auspices of the Yale Aeronautical Society. All college aero clubs in the United States will be represented and official representatives of universities engaged in aeronautical activities will be present. Members of the aeronautical industry who are interested in the development of college aviation will also attend.

Among the problems to be discussed are: the organization of college aero clubs, university recognition and cooperation; financing of clubs; activities of clubs; including research;

H. C. Garrett Perfects New Cam Shaft Engine

KANSAS CITY, MO.—Hugh C. Garrett, inventor and lubrication engineer connected with the Kansas City Branch of the Vacuum Oil Co., has perfected a new cam shaft airplane engine which he claims will develop more power than the conventonal type of engine. No crankshaft is employed and the new engine operates on a single driving cam. Thus the weight and the number of moving parts are materially reduced.

Vibration has been overcome in the new type of engine according to Mr. Garrett. In the use of the cam which he has designed, the number of cylinders which can be used successfully is not limited. Although there are virtually no limitations as to arrangement, the use of four cylinders in a double opposed arrangement is practicable. No matter what the number of cylinders may be, the cycle of operations of each cylinder remains the same. In the new engine each cylinder goes through two complete cycles of action in each revolution of the driving shaft, instead of one cycle in two revolutions of the driving shaft.

Fog Solution Sought By Guggenheim Fund

NEW YORK, N. Y.—Extensive experiments with every known means of combating fog are to be conducted in the near future by the Daniel Guggenheim Fund for the Promotion of Aeronautics, according to an announcement made recently by Harry F. Guggenheim, president. Col. Charles A. Lindbergh, who is consultant to the fund, will act as special adviser in the enterprise.

Plans call for the operation of specially designed planes with scientific equipment over certain portions of the established airplanes and for experiments with the radio beacon and with various means of dissipating fog. A large staff of pilots specially trained in blind flying will be employed.

In discussing the enterprise Mr. Guggenheim stated that it was in accord with the recently announced policy of the fund to concentrate on the fundamental research problems in aeronautics and that all the money needed for the experiments would be appropriated

New Lexington Commander

WASHINGTON, D. C.—Capt. Frank D. Berrien, U.S.N., has been ordered to command the aircraft carrier Lexington to succeed Rear Adm. Albert W. Marshall who will assume command of the Aircraft Squadrons, Scouting Fleet, about September 20.

New Flying Laws In Des Moines, Ia.

DES MOINES.—The Des Moines, Iowa, city council has adopted an ordinance prohibiting unlicensed pilots to operate planes within Des Moines and prohibiting the operation of unlicensed airplanes within boundaries of the city. The ordinance provides penalty of $100 fine or 30 days in jail. Exemption of the ordinance extends to public aircraft of the federal or state government. Clinton, Iowa, will adopt similar ordinance.

To End Use of Liberty Engines in U. S. Planes

WASHINGTON, D. C.—After the present fiscal year, no more Liberty engines will be installed in new planes of the Army Air Corps, it is authoritatively learned. About 2,000 have been withdrawn from storage, and modernized for usage in the craft now employing those powerplants.

Instead of having to face the enormous war-stock of Liberties again next year, the Air Corps can turn to other engines for its power. These include the new Wright 12-cylinder "V" type air-cooled engine of 500 h.p.; the Curtis Conqueror 12-cylinder "V" type water-cooled of 600 h.p.; the Curtis Chieftain of 12-cylinders, air-cooled, 600 h.p.; the Pratt & Whitney Wasp and Hornet and the Wright Cyclone, the latter three standard equipment in the Navy for fighting, fleet-spotting, torpedo and bombing and patrol work.

Present plans of the Air Corps call for installing the new Wright "V" air-cooled engine in the Loening amphibian, in which it will be mounted upside down. The Curtiss and Douglas observation planes, will be powered with the Conqueror as will the Boeing and Curtiss pursuit planes. The new Chieftain is due for installation in some of the Curtiss and Douglass observation and attack planes.

Chamberlin Buys Loening

NEW YORK, N. Y.—Clarence D. Chamberlin, trans-Atlantic flier and now consulting aeronautical engineer of New York City, has purchased a Wasp powered Loening Amphibian plane, it has been announced, for commuting purposes between his office at Pier A and the site of the New York airport on Barren Island. Chamberlin is working on plans for the establishment of seaplane bases in the Metropolitan vicinity besides directing work on the new Barren Island field.

War Planes to be In Coast Races

Army and Navy Craft Will Participate in Contests at Los Angeles

LOS ANGELES, CAL.—Pursuit and bombing planes from half the Army and Navy fields of the nation, the dirigible Los Angeles and one or more of the airplane carriers will be ordered to Los Angeles to participate in the National Air Races and Aeronautical Exposition, opening here September 8. This news has just been received here from Trubee Davison, assistant secretary of war, and E. P. Warner, assistant secretary of the Navy in charge of aeronautics. Dudley M. Steele, director of aviation for the Richfield Oil Co., is contest chairman of the air meet.

The Army participation was definitely outlined by Assistant Secretary Davison as follows:

"Twelve airplanes of the First Pursuit Group, which is located at Selfridge Field, Michigan, will fly to the National Air Races for the purpose of participating in the Mitchell Trophy Race. Twelve airplanes of the Third Attack Group will be ordered to Los Angeles to participate in a race for the General Mason M. Patrick Trophy. Nine airplanes from the Second Bombardment Group, located at Langley Field, Virginia, will be ordered to the west coast on a tactical mission during September and while there will be directed to visit Los Angeles for the period of the races."

Navy's Part Outlined

The Navy's part in the national event is outlined in a communication from Lieut. Commander A. P. Flagg, of Assistant Secretary Warner's office, at Washington, to Steele, which, in part, states:

"One or more carriers will be able to anchor in the vicinity of Ocean Park, Venice or Redondo Beach. It is practically assured that the dirigible Los Angeles will make a flight to the West Coast during the time of the air races. In case Commander Rosendahl is away at the time, Commander Wiley will probably take the Los Angeles out. There will be numerous formation and maneuverability flights which can be held daily at the discretion of the committee. We intend to enter the Navy Pursuit Race, the Free-For-All Pursuit Race and the Liberty Engine Builders' Trophy Race."

New Company in Seattle

SEATTLE, WASH.—The Barnes & Gorst Airlines, Inc., has been chartered in Seattle, Wash., with a capital stock of $50,000, for the purpose of engaging in commercial aviation.

Reviews

The book Department, Aviation, 250 West 57th St., New York City, can supply all books mentioned except government publications. N.A.C.A. publications may be obtained upon request from the National Advisory Committee for Aeronautics, Washington, D. C.

* * *

Beginning to Fly will be not only a service to every model builder, but a worthwhile spur to the development of aviation." This is the comment of Comdr. Richard Byrd, U. S. N. (Ret.), in the introduction he has written for "Beginning to Fly," a new book dealing with the design and construction of planes and scale and flying models by Merrill Hamburg, a teacher of model aviation in the Detroit public schools and secretary and advisor of the Airplane Model League of America.

Mr. Hamburg does not limit his discussions to model building entirely. He tells of the history of aviation, of modern aircraft and power plants, and of airfoil sections, before he even attempts to discuss models. In addition, there is an appendix in which the rules for the William B. Stout model contest are listed and the nomenclature of terms used in aviation are given. The book is dedicated to Mr. Stout "in appreciation of his active interest in the promotion of model aviation."

So far as models are concerned, Mr. Hamburg gives explicit instructions for building an out-door endurance model, a pusher model, an indoor tractor and scale models of the Curtiss "Hawk" and the Ford trimotored plane.

He tells also of the records that have been set by models, and gives detailed descriptions of the record breakers. It is believed that the book will do much toward interesting "Young America" more than ever in aviation. The price is $2.50.

* * *

Bureau of Aeronautics, U. S. N. Technical Note No. 186. Effects of Submergence in Water upon Aircraft Glued Joint Strength by Lieut. Lloyd Harrison (CC) U. S. N.

A service plane was landed in the Patomac River and after several hours of submergence the wing was inspected by the Forest Products Laboratory of the Department of Agriculture. It is stated that there was no evidence that the immersion of the craft caused any appreciable deterioration of the glue. This agrees with the Forest Products Laboratory studies of the properties of glues. Joints made with water-resistant casein glues, after soaking for a few days and then being redried, regain substantially their full strength. Many joints showed incomplete contact along the glue line which was attributed to foamy condition of mixed glue and insufficient pressure in gluing. It is concluded that an improvement in gluing practice in factories and repair stations will materially improve the quality of the joints and that present application of pressure by means of nails and brads is insufficient.

Wheeling Fokker Factory Opened

WHEELING, W. VA.—The Fokker Aircraft Corp. of America recently opened its new plant at Wheeling, W. Va., with 3,000 persons attending the opening. Operations began on Monday, August 13th.

D. V. Stratton of New York City, industrial engineer, is organizing the new factory on an industrial production basis.

Twenty-two tri-motor 12 passenger Fokkers are on order. The biggest contracts are for Western Airways and Pan American Airways, Inc.

Milwaukee Plans First Annual Aircraft Show

MILWAUKEE, WIS.—Plans for the first annual aircraft show held in co-operation with the Milwaukee Association of Commerce at the Wisconsin State Fair, August 27-September 1, are well under way, according to Fred C. Borcherdt, Jr., exposition business manager. Elling O. Weeks, president, treasurer of the Weeks Aircraft Corp., has been appointed director.

Provision has been made for a display of 12 or 15 airplanes in a pavilion on the fair grounds as well as exhibits of accessories and parts. The fair management is considering improving the area inside the race track for a landing field. An appropriation of $25,000 will be asked of the legislature to carry out the plan.

Assisting Mr. Weeks as committee members are such prominent aviation enthusiasts as Stuart Auer, Thomas Hamilton, president, Hamilton Aero Manufacturing Co.; Jerome Dretzka, secretary of the county park commission; Rudolph Hoskanson, Henry Staab and George O. Hoehn.

Three Day Air Meet Scheduled at Hyannis

HYANNIS, MASS.—An air meet will be held at the Hyannis Airport on September 7, 8 and 9, it has been announced. There will be more than 40 planes participating in the races, bombing contests, parachute jumping, dead stick landing, and other events. An active part in the air program will be taken by Miss Amelia Earhart, trans-Atlantic flier, who is one of the Hyannis Airport directors.

A grandstand accommodating 2,500 persons is being built for the meet, and beacons and landing lights are being installed. When complete, the Hyannis Airport will rank as a leading New England Field.

Breese is Winner In Colorado Race

Contest Held in Connection with Three Day Pike's Peak Air Tourney

COLORADO SPRINGS, COLO.—Vance Breese, who piloted a Ryan monoplane from Detroit, Mich., with four passengers, won the "On to Colorado Springs" race held in connection with the Pikes Peak Air Tourney, a three day celebration in connection with the dedication of the Colorado Springs Municipal airport, according to unofficial figures compiled by the Pikes Peak Aeronautic Contest committee. Breese made 1,150 mi. trip in 13 hr. and scored a total of 262.05 points.

Less than two points behind Breese came E. J. Peters of Cleveland, O., who flew a Laird commercial plane from that ctiy to Colorado Springs Thursday, capturing 259.85 points and losing a possible chance to take first honors because he carried only one passenger. Figures of points awarded to those finishing the race are—

Summary of Points

Vance Breese, 262.05; E. J. Peters, 259.85; Errett Williams, Shreveport, La., 221.01; Carl Winstead, Wichita, Kans., 211.05; O. M. Mosier, Colorado Springs, 207.41; Joe Shalse, Colby, Kans., 198.60; R. Leferink, Casper, Wyo., 186.92; D. P. Wardell, Casper, 176.83; J. Leferink, Casper, 165.32; Carl Keller, Wichita, 164,53; C. F. Hewitt, 162.08; P. E. Richter, Los Angeles, 152.15; F. Niswanger, Casper, 159.61; Tex Lagrone, 142.15. The winner gets a $1,000 prize.

About 75 airplanes are taking part in the celebration. Some of them are army planes from Kelly Field, Fort Sam Houston, Dodds Field and Lowry Field.

At 1:30 o'clock Saturday afternoon, August 11, the ships were lined up in a straight line at the field, pilots standing in front of them, and the field was formally dedicated. Speed and efficency races took place afterwards. Stunt flying, aerial clowning were features on the program.

Unauthorized

Notice is hereby given that the United States Volunteer Air Service is no authorized to act as a subscription agent for AVIATION, and that subscriptions sent in through this source will not be accepted by the Aviation Publishing Co.

Again—Stinsons Lead All Sir

in the NATIONAL RELIABILIT

THE STINSON JUNIOR

The Stinson Junior is a thoroughly reliable and beautifully upholstered four-place cabin monoplane. It combines every factor that makes for satisfactory private or commercial operation—high performance, ample speed, passenger comfort, operating economy, high payload, and for those who demand it, ability to get in and out of small landing fields. Standard equipment includes the oleo and spring landing gear, hydraulic tail wheel, brakes, cabin heaters and dual control. The Stinson Junior is priced at $6,750

Stinson planes finished third, fifth and sixth in the National Reliability Air Tour of 1928, beating by a wide margin *all* other single motored cabin planes.

Note the exceptionally high performance record of the Stinson Junior. Powered with the Warner Scarab 120 h. p. Engine and carrying a useful load of 993 pounds, the Stinson Junior consistently led and finished the Tour far ahead of *all* single motored cabin planes.

The Stinson Junior, received with unbounded enthusiasm at the All American Aircraft Show, was the outstanding plane in the National Reliability Air Tour of 1928 because of its beautiful appearance and design, and because of its efficiency and performance.

The Junior flew with wide open throttle for 95 hours at 2000 r. p. m. over the excessively hot regions of Texas, New Mexico, Arizona and over the mountain ranges and in the high altitude areas of the Northwest. Always carrying the maximum useful load the Stinson Junior gave 100% performance and reached altitudes of 12,500 feet without difficulty.

Such outstanding performance was secured at an extremely low cost. At full throttle for 95 hours the average gasoline consumption was 8 gallons per hour. During one period of 8 hours' flight, the oil consumption was only one quart.

The Stinson Junior has emphatically demonstrated its ability to give every aircraft buyer the fullest measure of efficiency, performance and economy such as Stinson planes have always given.

The Stinson-Detroiter six-passenger cabin plane, the leader of last year's Reliability Tour, carried a useful

The Official Tour results printed below are of v
purchaser. Quite frequently it is difficult for the
information about speed, load carrying ability, t
airplanes. The National Reliability Air Tour pr
Stinson with EVERY plane in the 1928 Reliabilit
with load, horse-power with load and last, bu

Official Rating and Scores in 192

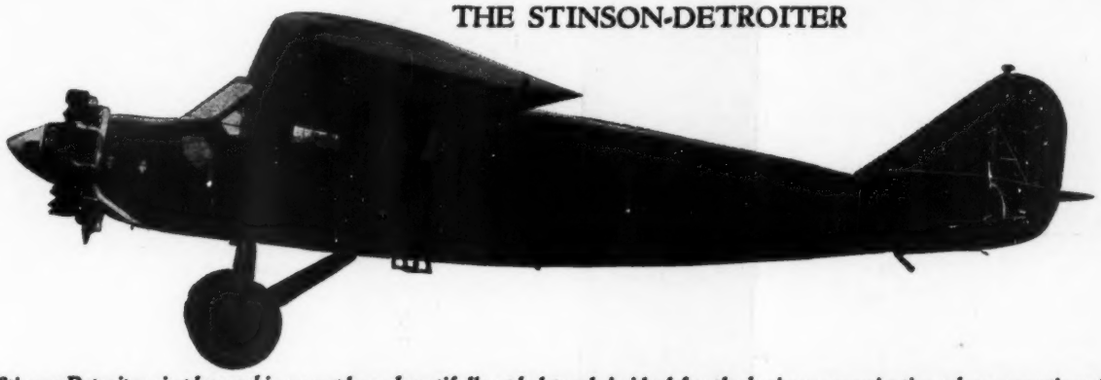
	Plane and Order of Finish	Engine	Horsepower	C H
1.	Waco-10	Whirlwind	220	
2.	Ford	3 Whirlwinds	660	
3.	**Stinson-Junior**	**Warner**	**120**	
4.	Waco-10	Whirlwind	220	
5.	**Stinson-Detroiter**	**Whirlwind**	**220**	**2**
6.	**Stinson-Detroiter**	**Whirlwind**	**220**	**2**
7.	Ryan	Whirlwind	220	
8.	Bellanca	Whirlwind	220	
9.	Ryan	Whirlwind	220	
10.	Buhl	Whirlwind	220	
11.	Lockheed	Whirlwind	220	
12.	Fairchild	Whirlwind	220	
13.	Travel Air	Caminez	140	
14.	Bellanca	Whirlwind	220	
20.	Ryan	Whirlwind	220	
23.	Curtiss Robin	O X 5	90	

STINSON AIRCRAFT CORPORATION

Single Motor Cabin Planes!

ITY AIR TOUR OF 1928

THE STINSON-DETROITER



The Stinson-Detroiter six-place cabin monoplane, beautifully upholstered, is ideal for the business organization whose executives desire quick transportation to and between their branch offices, manufacturing units, sources of supply, etc. The Stinson-Detroiter is used on many established air lines carrying U. S. Mail, passengers and express every day. It is powered by the famous Wright engine and is equipped with oleo and spring landing gear, cabin heaters, brakes, steel propeller, dual control and starter. The price is $12,500

e of vital importance to the prospective or the intending buyer to obtain accurate lity, take-off and landing time of various ur provides this information. Compare ability Tour for speed with load, take-off st, but not least, the LOAD CARRIED.

n 1928—National Air Tour

ower	Load Carried Pounds	High Speed With Load M. P. H.	Take-off Time With Load (seconds)	Landing Time With Load (seconds)	Points Earned
)	950	128.1	5.1	4.0	27013.4
)	3672	117.6	12.5	4.6	24390.8
)	**993**	**105.2**	**11.60**	**4.8**	**22786.5**
)	955	122.8	6.0	4.4	22127.1
)	**2112**	**120.5**	**14.4**	**9.6**	**21243.0**
)	**2083**	**117.0**	**16.2**	**7.2**	**19871.3**
)	1184	113.3	17.7	11.4	19728.9
)	1810	126.5	14.2	9.2	19445.3
)	1274	115.7	9.9	4.5	18389.3
)	1420	136.7	12.8	7.9	17948.1
)	1403	135.9	11.9	9.1	17596.6
)	1368	113.4	13.5	5.7	16974.5
)	783	94.0	10.3	5.4	15780.2
)	1778	124.0	14.8	14.2	15080.8
)	1310	117.6	11.4	5.1	8169.4
)	643	94.2	11.7	14.2	5949.9

load of 2112 pounds and finished well ahe d of every single motor, Whirlwind cabin plane in the 1928 Reliability Tour.

Compare this record with the loads carried by other planes. Then compare the speed with which the Stinson-Detroiter carried its load against the speeds of other planes carrying *considerably lighter loads.* Note also the Stinson-Detroiter's remarkably fast take-off time with its load; in fact, the heavily laden Stinson-Detroiter got off faster than several planes carrying *far less* loads.

Do you demand planes that can and will fly with heavy payloads at high speeds at the lowest cost, that can take-off quickly and land slowly? The Stinson-Detroiter, as proved by the official results of the 1927 and 1928 Reliability Air Tours, most effectively combines these essential factors.

Remember the Stinson reputation, strengthened now more than ever by the 1928 Tour performance record, for its ability to take-off quicker, land slower, climb faster than any cabin plane with the same load, same power and under similar conditions.

As a service to the many business organizations and commercial operators who are considering the purchase of planes, we will gladly prepare operating surveys and cost per mile estimates. Let us prove that aircraft operation pays dividends.

Stinson offers to commercial operators tried and proven equipment capable of *more* revenue loads per mile at *lower* cost per mile. To private owners and to business organizations Stinson offers planes that are outstandingly efficient, reliable, dependable and economical.

• NORTHVILLE • MICHIGAN

MANUFACTURERS' SPECIFICATIONS ON AMERICAN COMMERCI

THE TABLE BELOW IS BELIEVED TO BE ACCURATE BUT *AVIATION*

This table will appear monthly and corre

MANUFACTURER	Designation	Price of Plane at Factory	Type	No. of Seats	Make of Engine	Total Rated HP.	Make of Propeller	Span	Wing Area (Sq. Ft.)	Length Overall	Height Overall	Weight Empty (Lb.) With Water if Water Cooled Engine Is Used	Pay Load (Lb.)	Disposable Load (Lb.)	Normal Gross Weight Loaded (Lb.)	High Speed
Advance Aircraft Co.	Waco 10	$ 2035*	OBL	3	RS9	125	.....	30' 9"	272	23' 3"	9' 5"	....	....	....	....	
Advance Aircraft Co.	Waco 10	$2035*	OBL	3	OX5	90	H,Hs	30' 8"	272	23' 3"	9' 5"	1200	760	825	2025	10
Aero-Craft Mfg. Co.	Aero-Coupe	.....	SBL	3	W	110	.....	32'	250	24'	8" 6'	1100	550	100	2100	11
Alexander Aircraft Corp.	Eaglerock	$2,250*	OBL	3	OX5	90	.....	36' 8"	330	24' 11"	9' 11"	....	....	....	2230	10
Alexander Aircraft Corp.	Eaglerock	$2,250*	OBL	3	RS9	125	.....	36' 8"	330	24' 11"	9' 11"	....	....	....	2230	11
American Eagle Aircraft Co.	.....	$2385	OBL	3	OX5	90	H, Hs	30'	300	24' 6"	8' 4"	1227	840	830	2057	10
Arkansas Aircraft Corp.	Comm'd-Aire	$3,250	OBL	3	OX5	90	.....	31' 6"	300	24' 6"	8'	1275	....	800	3075	10
Arkansas Aircraft Corp.	Heinkel H.D. 40	.....	CBL	2	PWw	400	.....	57'	250	39'	14'	....	2500	....	....	14
Atlantic Aircraft Corp.	F-7 & C-2	$44,500	CML	10-12	J-5	600	H	63' 3"	630	49' 2"	12' 9"	5430	2000	3720	9060	12
Atlantic Aircraft Corp.	Universal	$14,200	CML	5-7	J-5	200	H, Hs	47' 9"	341	33'	8' 9"	2100	1200	1900	4000	11
Atlantic Aircraft Corp.	Super-Univ	$19,340	CML	6-8	P Ww	400	SS	50' 6"	382	36"	8' 11"	2800	1230	2200	5000	14
Atlantic Aircraft Corp.	Fokker F-10	$60,000	CML	14	3-PWw	1200	SS	71'2"	728	50' 8"	12' 5"	7200	2640	4950	11500	14
Arrow Aircraft Corp.	Arrow-Sport	$2,257	OBL	2	LB	60	.....	25' 6"	178	19' 2"	6' 11"	524	....	450	974	10
Bach Aircraft Co.	Air Yacht	$31,800	CML	10-12	2-RSg-pww	650	2 Sty ,SS	52'	412	38.1	9' 6"	3300	....	3200	6500	15
Bellanca Aircraft Corp.	CH	$14,500	CML	6	J5	200	Hs	46' 4"	273	24' 9"	8 6	1850	1100	1850	3700	12
Berliner Aircraft Co.	.....	.....	OML	3	J5	200	SS	34'	206	25'	8'	1400	....	....	2033	13
Bird Wing Commr. Airplane Co.	No. 6	$2,795	OBL	3	OX5	90	Hs	31' 4"	303	23 6"	8' 7	1236	550	1019	2255	9
Boeing Airplane Co.	40A	.....	SBL	1-5	P Ww	400	H, M	44'2"	545	34'3"	11' 7"	3031	1600	2469	5500	13
Boeing Airplane Co.	B-1D	$15,000	CBF	4	J5	200	....	39' 8"	466	30' 9"	12'	2412	720	1000	3442	9
Bourdon Aircraft Corp.	Kitty-Hawk	$4,800	OBL	3	R37	96	Hm	28 6"	240	22'2"	7'9"	1150	....	750	1900	10
Breese Aircraft Co.	.....	.....	CML	6	J5	200	SS	41'	260	4..	10'6"	155	..	1000	2550	13
Brown-Mercury Aircraft Corp.	C-3	$9,800	CML	3	3-A6	180	Sty	41' 6"	260	25'	.....	1450	600	1500	2950	12
Buhl Aircraft Co.	Airsedan-C5A	$12,500	CBL	5	J5	200	SS	42'	320	28	14'	2072	1000	1628	3700	*2
Buhl Aircraft Co.	Airster	$10,000	OBL	3	J5	200	SS	35' 8"	309	23' 2"	9' 7"	1575	800	1380	2955	12
Cessna Aircraft Co.	3-120	3,575*	CML	3	A	120	H H	40'6"	224	23' 8	7 4	1250	480	750	2000	12
Cessna Aircraft Co.	4-125	4,075*	CML	4	RS9	125	H. H:	40'6"	224	23' 8	7 4	1260	760	1030	2280	12
Cessna Aircraft Co.	4-200	4,475*	CML	4	J5	200	H H:	40'6"	224	23' 8	7 4	1358	800	1070	2420	15
Crawford M. & A Mfg. Co.	A1	$1,500	OML	2	LR	80	own	30'	150	17'	8'	950	....	450	1400	9
Crown Motor Carriage Co.	Airster	.....	OBL	2-3	K-5	100	S	28' 6"	236	21' 3"	8' 5"	850	330	700	1500	11
Curtiss-Robertson A'p'he Mfg. Co.	Robin	.....	CML	3	OX5	90	CR	41'	265	25' 9"	7' 10"	1400	....	700	2100	10
Driggs Aircraft Corp.	Dart II	$1,900	OBL	2	A3	35	Hs	28'	140	19' 6"	6'	450	....	370	820	8
G. Elias & Bros.	M-1	$7,500	OBL	1	L12	400	CR	40'	497	28'	12	2857	1200	2010	4867	12
G. Elias & Bros.	Airmobile	$7,500	OBL	4	L12	400	CR	40'	435	28'	11' 3"	2759	420	1290	4049	14
Fairchild Airplane Mfg. Co.	FC-2W	.....	CML	5	P Ww	400	SS	50'	332	30' 11"	9'	2570	970	830	4600	14
Fairchild Airplane Mfg. Co.	FC-2W sea	.....	CMW	5	P Ww	400	SS	50'	332	33' 4"	12'	2418	1130	2182	5150	13
Fairchild Airplane Mfg. Co.	FC-2 land	.....	CML	5	J5	200	CR	44'	290	30' 11"	9'	2150	845	1456	3650	12
Fairchild Airplane Mfg. Co.	FC-2 sea	.....	CMW	5	J5	200	CR	44'	290	32' 5"	11' 5"	2427	833	1573	4000	11
Federal Aircraft Corp.	CM-1	$12,500	CM	5	J4B	200	We	37' 6"	262	29' 3"	9'	2080	630	1395	3475	12
Gillis Aircraft Corp.	Crusader	.....	CBL	4	RS9	125	Hm	32 9	245	23'	9'	....	....	....	2400	11
Hamilton Metalplane Co.	H-19	.....	CML	6	J5	200	H	48'	287	32' 7"	8' 10"	1960	....	2000	3960	12
Hamilton Metalplane Co.	H-21	.....	CML	8	PWw	400	H	54'	392	33' 7"	9'	2685	....	2205	4700	13
Heath Airplane Co.	Parasol	$595	OML	1	H	23	own	23'	94	16'9"	5' 11"	290	....	225	515	7
International Aircraft Corp.	F-17	$2,750*	OBL	3	OX5	90	H	35'	325	25	9' 6"	1300	400	821	2121	10
International Aircraft Corp.	F-17	$2,900*	OBL	4	J5	200	SS	35'	325	25	.....	1350	400	1239	2589	14
International Aircraft Corp.	F-18	$2,250*	OBL	7	J5	200	SS	37'	360	27' 6"	10' 6"	1550	1000	1843	3393	13
Ireland Aircraft, Inc.	Neptune	$14,600	CMA	5	J5	200	CR	40	350	31' 6"	11' 6"	2250	750	1358	3608	9
Irwin Aircraft Co.	M-T 2	$1,165	OBL	1	179	25	own	20'	105	13' 6"	5' 9"	275	100	300	575	9
Keystone Aircraft Corp.	Pronto	.....	OBL	3	J5	200	.....	39' 11"	365	28' 9"	.....	1975	....	1310	3285	11
Keystone Aircraft Corp.	Pathfinder	.....	CBL	12	3-J5	600	.....	68' 6"	1150	40' 4"	.....	6536	1900	4481	10841	11
Kinner A. & M. Co.	Courier	.....	OML	2	K-	100	SS	35'	216	23'	7'	915	....	550	1465	12
Kreider-Reisner Aircraft, Inc.	Challenger	.....	OBL	3	OX5	90	Hs, H	30' 1"	296	23' 9"	9' 4"	1189	412	811	2000	10
E. M. Laird Airplane Co.	Commercial	.....	OBL	3	J5	200	SS	34'	300	23' 6"	9' 3"	1550	800	....	....	13
Laird Aircraft Corp.	Whippoorwill	.....	CBL	4	J-5	200	.....	36'	351	27	9	1650	....	1000	2650	12
Lincoln Aircraft Co.	Lincoln-Page	.....	OBL	3	OX5	90	.....	32'	300	.....	.....	1200	450	1000	2200	10
Lockheed Aircraft Co.	Vega	.....	CML	5-7	J5	200	SS We	41'	275	27' 5"	8' 6"	1650	1000	1550	3200	13
Lockheed Aircraft Co.	Air Exp.	.....	CML	5-7	P Ww	400	SS	41'	275	27' 5"	8' 6"	1850	1000	1845	3645	16
Loening Aeronautical Engr. Corp.	Cabin Amphibian	$26,700	CBA	5-7	PWw	400	SS	45'	504	34' 8"	13' 2"	3400	1200	2000	5400	12
B.F. Mahoney Aircraft Corp.	Ryan B1	$12,200	CML	5	J5	200	H W	42'	290	27' 5"	9' 10"	1870	800	1430	3300	12
Metal Aircraft Co.	Flamingo GMT6	.....	CML	6-8	PWw	400	SS	48'	354'	30'	9'	2800	....	2050	4850	14
Mono Aircraft inc.	Monocoupe	$2,675	OML	2	V	70	Hs	30' 6"	124	22'	6' 3"	725	....	500	1225	9
Mohawk Aircraft Corp.	Pinto	$2,375	CML	2	A	60	.....	30'	150	20	6' 3	700	....	475	1175	10
National Airways System, Inc.	Air King	$2,395	OBL	3	OX5	90	Hs	34' 1"	310	25' 5	9'	1290	....	800	2090	10
Niles Aircraft Co.	Williams	.....	OML	1	Sa	40	.....	20'	108	18	6'6"	440	....	....	....	8
Pheasant Aircraft Co., Inc.	H-10	$2,375	OBL	3	OX5	90	Hs	32' 6"	283	23' 6"	9'	1297	600	785	2082	10
Pitcairn Aviation, Inc.	Mailwing	$10,000	OBL	1-3	J5	200	SS	33'	252	22' 10"	8' 10"	1612	600	770	2512	13
Pitcairn Aviation, Inc.	PA-4	.....	OBL	3	OX5	90	Hs	30'	226	21' 10"	8'7"	1165	....	785	1950	10
Prudden-San Diego Airplane Co.	T-M-1	.....	CML	7	3-RS9	375	Wd	57'	427	38'	9' 5"	3000	1200	2152	5152	11
Richmond Airways, Inc.	Sea Hawk	.....	OMF	5	C6	160	.....	48'	317	28'	.....	1700	....	1000	2700	9
Sikorsky Mfg. Co.	S-36	.....	OBs	8	2-J5	400	.....	72'	668	34"	12'	4600	....	3000	7600	11
Sikorsky Mfg. Co.	S-37	.....	CBL	18	2P Wh	1000	.....	100'	1049	45' 6"	16' 3"	8000	4000	7000	15000	12
Sikorsky Mfg. Co.	S-38	.....	OBA	11	2P Ww	800	SS, H	71' 8"	720	39' 8"	.....	5300	1530	3000	8830	12
Simplex Aircraft Corp.	Red Arrow	$3,950	CML	2	K5	100	Sty	33' 4"	148	20' 3"	6' 10"	1000	....	600	1600	12
Starling Aircraft Co.	.....	.....	OB	3	OX5	90	.....	32'	....	23'4"	9 '	1237	....	600	1837	10
Stearman Aircraft Co.	C-2-K	$6,740	OBL	3	RS9	125	H, Hs	35'-28'	296	24'	9'	1285	350	865	2150	11
Stearman Aircraft Co.	C-2-B	$8,730	OBL	3	J5	200	H. CR	35'-28'	296	23	9'	1438	400	962	2400	13
Stinson Aircraft Corp.	SB-1	$11,000	CBL	5	J5	200	SS	35' 10"	354	28' 10"	10' 3"	1815	....	1465	3280	11
Stinson Aircraft Corp.	Sm-1B	$12,500	CML	6	J5	200	SS	45' 10"	292	32'	9'	1970	....	1515	3485	12
Stinson Aircraft Corp.	Junior	$6,750	CML	4	W	110	Wd	39' 6"	236	26' 3"	7' 10"	1450	525	1000	2450	10
Spartan Aircraft Co.	C-3	.....	OBL	3	RS9	125	.....	32'		23' 6"	8' 9"	1140	....	800	1940	11
Stout Metal Airplane Co.	4 AT	.....	CML	12	3J5	600	SS	74'	785	49' 10"	12' 8"	6200	....	3800	10000	11
Swallow Airplane Mfg. Co.	Commercial	.....	OBL	3	OX5	90	.....	32'	300	24'	8' 6"	1470	360	730	2200	10
Taylor Bros. Aircraft Co.	Chummy	$3,800	SML	2	K-5	100	.....	34'	175	22'	7'6"	950	160	550	1500	11
Texas Aero Corp.	Temple	.....	OML		J5	200	.....	39' 4"	225	25' 10"	8' 3"	....	567	....	2250	..
Thaden Metal Aircraft Co.	T-1	.....	CML	7	P Ww	400	.....	53	....	35	11	2900	....	2200	....	..
Thunderbird Aircraft, Inc.	W-14-O	$2,950*	OBL	3	OX5	90	Sty	31'	278	24' 8"	9' 7"	1433	340	815	2248	11
Thunderbird Aircraft, Inc.	W-14-H	.....	OBL	3	E	150	Sty	31'	278	24'8	9' 7"	1551	520	945	2496	13
Travel Air Mfg. Co.	2000	$2,950	OBL	3	OX5	90	H, Hs	34' 8"	296	24' 2"	8' 9"	1350	350	750	2100	10
Travel Air Mfg. Co.	4000	$9,100	OBL	3	J5	90	H	34' 8"	296	23' 6"	8' 9"	1400	600	1000	2400	13
Travel Air Mfg. Co.	6000	$13,000	CML	5	J5	200	SS, H	48' 7"	282	30' 10½"	18' 8½"	2375	944	1625	4000	12
Travel Air Mfg. Co.	Camines	.....	OBL	3	FC	135	HH, s	34' 8"	296	24'2"	8'9"	1275	400	875	2150	11
Travel Air Mfg. Co.	9000	.....	OBL	3	RS9	125	W	34'8"	296	24'2"	8'9"	1250	360	960	2210	10
Wallace Aircraft Co.	Touroplane	$2,500*	CML	3	A	80	Hs	37'	205	23' 6"	7' 6"	850	320	650	1500	9
Whitee Aircraft.	Hum. Bird	$2,150	OBL	3	OX5	90	Hs	33' 1"	318	23' 6"	8' 3"	1050	450	850	1900	9
Western Airplane Corp.	King Bird	$2,500	OBL	3	OX5	90	Hs	35'	320	25' 4"	9'	1200	600	800	2000	9
Zenith Aircraft Corp.	Albatross	$35,000	CML	14	3-RS9	375	Sty.	90'	1032	50' .	12' 6"	4000	5000	7000	12,000	10

TYPE:

A—Amphibian
B—Biplane
C—Closed
F—Flying boat
L—Landplane
M—Monoplane
O—Open
S—Semi-closed
W—Seaplane

ENGINE: One engine unless stated in italics.

A—Anzani
C6—Curtiss
E-Wright Hispano-E
FC—Fairchild Caminez
H—Henderson
179—Irwin
J5—Wright Whirlwind
K—Kinner
L—Liberty
LB—Le Blond
LR—LeRhone
OX5—Curtiss
P Wh—Pratt & Whitney Hornet
P Ww—Pratt & Whitney Wasp
RS—Ryan Siemens
SR—Super Rhone
Sa—Szekely
V—Velie
W—Warner
*—Price without engine

PROPELLER:

CR—Curtiss Reed
H.—Hamilton
Hs—Hartzell
M—Metal
Sty—Story
SS—Standard Steel
W—Wood
We—Westinghouse

MERCIAL AIRPLANES AND SEAPLANES AS COMPILED BY *AVIATION*

***ATION* DOES NOT ASSUME RESPONSIBILITY FOR THE FIGURES GIVEN**

thly and corrections and suggestions are invited.

Normal Gross Weight Loaded (Lb.)	Performance With Full Load at Sea Level As Supplied by Manufacturers.						Fuel Capacity in Gallons	Normal Range in Miles	Normal Fuel Consumption at Cruising Speed Gal. Per Hr.	Fuselage Construction	Wing Construction	Are Wings Wired for Lighting?	Type of Control	Brakes	Type of Shock Absorber	Type of Pontoon Provided for	Additional Cost as Seaplane	Dept. of Commerce Type Certificate Number	Performance Figure Guaranteed?	
	High Speed in M.P.H.	Cruising Speed in M.P.H.	Landing Speed in M. P. H.	Climb at Sea Level in F. P. M.	Climb to 10'000 in Minutes	Service Ceiling in Feet														
....	..	..	..	750	..	....	37	..	....	Wl-ST	Wd-F	No	SPD	Ex.	H	EFH	1,100	26	....	Advance—Waco 10
2025	101	95	35	750	29	12,000	37	550	7.5	Wl-ST	Wd-F	No	SPD	Ex.	H	EFH	1,100	13	No.	Advance—Waco *10*
2100	110	100	..	900	..	....	46	460	....	Wl-ST	Wd-F	Yes	SD	....	....	....	....	....	....	Aero-Craft—Coupe
2230	101	87	34	514	..	10,200	46	435	10.3	Wl-ST	Wd-F	....	SCD	....	RC	E	....	7	....	Alexander—Eaglerock
2230	113	85	34	630	..	14,780	46	425	10	Wl-ST	Wd-F	$20	SCD	....	RC	E	....	..	Yes	Alexander—Eaglerock
2057	101	85	30	575	45	12,000	42	425	7.5	Wl-ST	Wd-F	No	SPD	Ex.	RAR	E	$990	17	....	American Eagle
2075	104	..	36	..	..	....	..	400	....	Wl-ST	Wd-F	....	S	....	RC	....	....	..	....	Arkansas—Com'd'aire
....	140	..	54	..	..	....	..	....	....	Wl-ST	Wd-F	....	DeD	....	....	....	....	..	5% N	Arkansas—Heinkel H.D. 40
9060	122	100	55	720	24	12,500	185	580	32	Wl-ST	Wd-P	Yes	DeCD	Yes	RAR	....	....	Apl	....	Atlantic—Fokker F7 & C-2
4000	118	98	48	500	40	11,500	78	600	12	Wl-ST	Wd-P	Yes	SCD	Yes	RC	Met.	$2450	9	....	Atlantic—Fokker Univ.
5000	140	118	42	1000	15	18,000	120	700	20	Wl-ST	Wd-P	Yes	SCD	Yes	RAR	Met.	$3110	Apl	5%	Atlantic—Super Univ.
1500	148	125	55	1400	10	18,000	286	580	60	Wl-ST	Wd-P	Yes	DeCD	Yes	RC	....	....	....	....	Atlantic—Fokker F-10
974	105	..	36	650	..	15,200	..	..	....	Wl-ST	Wd-F	....	S	....	RC	....	....	..	....	Arrow—Sport
6500	150	110	45	1100	12	18,000	170	500	32	Wd-P	Wd-F	Yes	DeCD	S-B	Hy-C	....	....	..	Yes	Bach—Air Yacht
3700	128	110	46	850	..	13,000	85	800	10	Wl-ST	Wd-F	Yes	SCD	....	RC	D	....	....	....	Bellanca—CH
2033	136	110	44	..	..	....	44	450	10	Wl-ST	Wd-F	....	D	Yes	....	....	....	39	....	Berliner
2255	90	80	30	460	80	10,000	35	325	9	Wl-ST	Wd-F	Yes	SC PD	ex.	RC	E	$990	Apl	Yes	Bird Wing—No. *6*
5500	130	..	54	770	19	15,000	100	..	..	Wl-ST	Wd-F	Yes	S	Yes	O	....	....	2	....	Boeing—*40A*
3442	95	..	52	..	..	12,000	40	..	....	Wd	Wd-F	Yes	DeD	....	....	....	....	23	....	Boeing—B-1D
1900	100	95	38	..	..	15,000	38	..	6.5	Wl-ST	Wd-F	....	SPD	....	RC	....	....	..	....	Bourdon Kitty Hawk
2550	130	115	43	900	..	15,500	80	550	9.5	Wl-ST	Wd-F	....	....	....	RC	....	....	..	....	Breese
2950	120	100	40	600	35	14,000	78	650	12	Wl-ST	Wd-F	Yes	SC	....	Grs.	No	....	Apl	Yes	Brown-Mercury—C-3
3700	120	95	50	700	45	13,500	70	..	15	Wl-ST	Wd-F	Yes	SC	Yes	RD	Met	$2,500	33		Buhl Airsedan
2955	125	100	45	1150	10	18,000	64	500	12	Wl-ST	Wd-F	Yes	S	Yes	RD	Met.	$2,500	1	Yes	Buhl Airster
2000	120	110	45	1000	..	....	42	400	10	Wl-ST	Wd-PF	Ex.	SPD	E.	RAR	....	....	Apl	5%	Cessna Aircraft Co.
2280	125	115	45	1000	..	....	42	400	10	Wl-ST	Wd-PF	Ex.	SPD	E	RAR	....	....	Apl	5%	Cessna Aircraft Co.
2420	150	125	45	1400	..	....	42	400	12	Wl-ST	Wd-PF	Ex.	SPD	Ex	RAR	....	....	pl	5%	Cessna Aircraft Co.
1400	95	64	47	..	..	13,000	40	500	6	ST-Wd	Wd-F	No	D	....	RC	....	....	No		Crawford—A1
1500	110	90	35	750	45	14,000	27	400	6	Wd	Wd-F	No	SD	No	Grs	....	....	Apl	Yes	Airster
2100	100	85	40	500	..	11,000	50	785	....	Wl-ST	Wd-F	....	SD	....	RAR	....	....	40	....	Curtiss—Robin
820	85	75	40	500	..	15,000	15	375	3	Wl-ST	Wd-FD	Yes	..	No	RC	None	....	15	....	Driggs—Dart II
4867	126	105	45	1250	19	15,000	100	525	20	Wl-ST D	Wd-F	Yes	C	No	TR	....	....	No	....	G. Elias & Bros.—MF
4049	146	125	45	1050	10	16,000	100	625	20	Wl-ST	Wd-F	Yes	SC	No	RC	....	....	..	....	Elias—Airmobile
4600	140	120	55	580	12	18,000	160	1050	18	Wl-ST	Wd-F	Yes	S-CP	Yes	Hy	F	....	20	....	Fairchild—FC-2V land
5150	130	110	58	420	21	12,000	160	950	18	Wl-ST	Wd-F	Yes	S-CP	....	....	F	....	20	....	Fairchild—FC-2W sea
3650	122	103	53	580	27	13,100	110	710	15.5	Wl-ST	Wd-F	Yes	S-CP	Yes	Hy	F	....	10	....	Fairchild—FC- land
4000	112	..	53	1250	36	12,700	110	650	15.5	Wl-ST	Wd-F	Yes	S-CP	....	....	F	....	10	....	Fairchild—FC-2 sea
3475	125	105	40	..	..	....	84	750	10	Wl-ST	Wd-ST	Yes	SC	Yes	Arl	....	....	..	....	Federal Aircraft—CM-1
2400	110	90	45	600	..	11,500	45	420	....	Wl-ST	Wd-F	Yes	DeD	B	O	....	....	..	....	Gillis—Crusader
3960	120	100	50	750	..	14,000	80	650	12	D-cor.	D-cor.	Yes	SPD	Yes	O	H	$2500	..	5%	Hamilton—H-19
4700	135	115	55	1250	..	18,000	150	750	21	D-cor.	D-cor.	Yes	SPD	Yes	O	H	$3000	..	5%	Hamilton—H-21
515	70	65	32	200	..	....	3.3	120	....	R-ST	Wd-F	No	SC	No	RC	....	....	..	....	Heath—Parasol
2121	100	87	35	600	..	10,500	40	450	....	Wd	....	....	S	Ex.	O	....	....	35	5%	International—F-*17*
2589	140	120	35	1000	..	16,000	66	700	....	Wd	Wd-F	....	S	Ex	O	....	....	Apl	5%	International—F-*17*
3393	130	110	40	800	..	15,000	106	1000	....	Wd	Wd-F	....	S	Ex.	O	....	....	Apl	5%	International—F-*18*
3608	95	85	46	650	35	11,000	65	500	12	ST-D	Wd-F	Yes	DeD	No	O	....	....	Apl	5%	Ireland—Neptune
575	90	75	28	400	65	12,000	8	300	1.7	Wd	Wd-F	Yes	SC	....	RC	W	$175	..	6%	Irwin—M-T-*2*
3285	112	..	..	800	..	14,000	60	..	....	Wl-ST	Wd-F	....	....	....	....	....	....	..	....	Keystone—Pronto
0841	112	..	57	570	..	....	..	500	....	Wl-ST	Wd-F	....	....	....	....	....	....	..	....	Keystone—Pathfinder
1465	120	110	35	900	..	20,000	..	800	7	Wl-ST	Wd-F	....	....	S	Grs.	....	....	..	....	Kinner—Courier
2000	102	..	39	548	..	12,000	..	400	....	Wl-ST	Wd-F	Ex.	SD	No	RC	EH	$1,000	19	5% N	Kreider-Reisner—Challenger
....	130	10	40	1350	10	....	80	600	....	DT, S	Wd-F	....	SPA	....	....	....	....	..	....	E. M. Laird—Commercial
2650	125	105	40	..	15	....	..	..	....	Wl-ST	Wd-F	Yes	DeD.	Std	RC	....	....	..	....	Laird—Whippoorwill
2200	100	..	35	600	..	....	42	500	....	Wl-ST	Wd-F	....	....	....	....	....	....	28	....	Lincoln—Page
3200	135	110	50	1000	16	15,900	100	700	10	W-mon.	Wd-P	Yes	SC	H	RHy	E	....	Apl	5%	Lockheed—Vega
3645	167	135	55	1460	10	17,250	100	1000	18	W-mon.	Wd-P	Yes	SC	H	RHy	....	....	Apl	5%	Lockheed—Air Express
5400	120	..	50	..	..	14,000	140	650	....	Wd-D	Wd-F	Yes	DeC	Ex.	RC	....	....	34	....	Loening—Amphibian
3300	126	108	49	1000	..	16,000	83	700	10-11	Wl-ST	Wd-F	....	SC	S	Grs	E	....	25	Yes	B. F. Mahoney—Ryan B1
4850	140	120	48	1375	..	....	150	1000	18	Wl-ST D	D	Yes	DeDC	S	Arl	....	....	..	....	Metal—Flamingo
1225	90	75	35	800	..	12,000	..	360	20	Wl-ST	Wd-F	Yes	S	Std	Arl	....	....	..	....	Mohawk—Pinto
1175	102	87	35	700	35	....	25	4 0	4	Wl-ST	Wd-F	Yes	SP	....	RC	..	....	22	Yes	Mono Aircraft Monocoupe
2090	103	85	35	600	..	15,000	35	396	8	Wl-ST	Wd-F	No	S	No	RC	....	....	29	....	National Airways—Air King
....	85	..	30	925	..	....	..	360	....	Wl-ST	Wd-F	....	SC	Std	....	....	....	Apl	....	Nilles—Williams
2082	100	90	35	500	25	12,500	38	400	9	Wl-ST	Wd-F	Ex.	SPD	Ex.	RC	EH	$1,000	36	....	Pheasant—H*10*
2512	136	105	45	1600	..	11,000	60	600	....	Wl-ST	Wd-F	Yes	S	Yes	Arl	....	$900	18	5%	Pitcairn—Mailwing
1950	101	82	45	..	..	....	35	400	....	Wl-ST	Wd-F	....	S	....	Grs	....	....	..	Yes	Pitcairn—PA-*4*
5152	110	95	52	500	25	11,000	110	400	21	D-cor.	D-cor.	....	....	B	Grs.	....	....	..	....	Prudden-San Diego—T-M-1
2700	95	..	45	..	..	....	42	..	....	Wd-D	Wd-F	....	DeCP	....	....	....	....	..	....	Richmond Airways—Sea Hawk
7600	115	100	51	400	..	11,000	326	1000	25	Wd-D	DOR, B	....	De D	....	RDO	....	....	..	5%	Sikorsky—S*36*
5000	122	112	58	650	..	15,000	370	790	50	DOR, B	DOR, B	....	De D	Hy	RDO	....	....	Apl	5%	Sikorsky—S*37*
8800	129	110	52	1100	18	20,100	2.0	600	36	Wd-D	DOR, B	....	DeD	....	DOS	....	....	Apl	....	Sikorsky—S38
1600	125	110	40	1000	17	16,000	..	1250	5.5	Wl-ST	Wd-F	Yes	S	....	....	....	....	..	5%	Simplex—Red Arrow
1837	104	95	30	..	15,000	....	40	400	....	Wl-ST	Wd-F	....	SD	....	HyC	....	....	..	....	Starling
2150	110	90	38	625	..	12,000	50	500	7	Wl-ST	Wd-F	Yes	PC	St.	RHy	D	....	Apl	5%	Stearman—C-*2*-K
2400	130	110	41	1000	..	18,000	65	620	11.5	Wl-ST	Wd-F	Yes	PC	St.	RHy	D	$1,200	Apl	5%	Stearman—C-*2*-B
3280	118	100	46	600	..	13,500	70	600	11.5	Wl-ST	Wd-F	Yes	DeD	St.	....	M	$2,500	24	5%	Stinson—SB-*1*
3485	128	105	55	750	..	14,000	90	700	11 5	Wl-ST	Wd-F	Yes	DeD	St.	Hy	M	$2,500	16	5%	Stinson—SM-*1*
2450	105	90	45	..	..	....	45	550	....	Wl-ST	Wd-F	Yes	DS	Yes	Hy	....	....	..	....	Stinson—Junior
1940	115	..	37	800	..	....	44	600	....	Wl-ST	Wd-F	....	S	....	RC	....	....	..	....	Spartan—C-3
0000	114	100	59	..	..	14,000	235	540	9	D-cor.	D-cor.	Yes	DeD	St	O	....	....	..	....	Stout—Ford—4A7
2200	100	..	35	600	..	....	36	500		Wl-ST	Wd-F	....	....	....	RC	....	....	21	....	Swallow—Commercial
1500	110	100	38	850		....	30	500	6	Wl-ST	Wd-F	Yes	SP	....	RC	....	....	..	Yes	Taylor Bros.—Chummy
2250	..	..	..	..	..	....	50	..	....	Wl-ST	Wd-F	....	S	....	....	....	....	..	....	Texas—Temple
....	..	..	..	..	..	....	120	..	....	D-cor.	D-cor	....	De	....	Grs.					Thaden Metal—T-1
2248	114	95	40	800	20	15,000	43	440	10	Wl-ST	Wd-F	Yes	SpeD	Ex	R	EH Ex	$1,100	Apl	5%	Thunderbird W14-O
2496	135	110	42	1000	16	16,000	60	440	15	Wl-ST	Wd-F	Yes	SpeD	Ex	R	EH Ex	$1,100	Apl	5%	Thunderbird W-14-H
2100	100	..	40	..	..	....	42	410	8	Wl-ST	Wd-F	Yes	SPC	No	RC	....	....	30	....	Travel Air—*2000*
2400	130	..	45	..	..	....	60	..	12	Wl-ST	Wd-F	Yes	SPC	No	RC	....	....	32	....	Travel—*4000*
4000	128	107	50	700	..	12,000	78	650	12	Wl-ST	Wd-F	Yes	DeD	Yes	O	....	....	..	....	Travel Air—*6000*
2150	110	..	37	..	..	....	42	475	....	Wl-ST	Wd-F	Yes	SPC	....	RC	....	....	37	....	Travel Air—Caminez
2210	105	..	42	..	..	....	66	650	....	Wl-ST	Wd-F	Yes	SPC	....	RC	....	....	38	....	Travel Air—Siemens
1500	95	82	40	670	37	11,000	28	500	5.25	Wl-ST	Wd-F	Yes	SPD	....	Hy	....	....	..	....	Wallace—Touroplane
1900	97	90	35	600	..	14,000	40	350	8	Wd WIS	Wd-F	No	S	....	C	E	....	Apl	5%	Whitee—Hummng Bird
2000	95	85	30	600	20	12,000	..	500	8	Wl-ST	Wd-F	No	SC D	No	RC	Own	$1,000	No	5%	Western—King Bird
2,000	100	85	35	600	..	20,000	300	1000	20	Wl-ST	Wd-F	Yes	C	Yes	Arl	No	....	..	Yes	Zenith—Albatross

FUSELAGE AND WING CONSTRUCTION:
B—Bolted
Cor.—Corrugated
D—Duralumin
F—Fabric cover
Mon—Monocoque
O—Open section

BRAKES:
B—Bendix
Ex—Extra
H—Hydraulic
L—Lockheed
S—Sausedde
Std—Standard

P—Plywood cover
R—Rivsted
S—Steel
T—Tubing
Wd—Wood
Wl—Welded

LIGHTS:
N—Navigation lights

CONTROL:
A—Arens
C—Cables
D—Dual
De—Wheel
P—Push rods
S—Stick
Pl—Pedal

SHOCk ABSORBER:
Arl—Aerol
C—Cord
D—Compression
Grs—Gruss
Hy—Hydraulic
O—Oleo
R—Rubber
RAR—Rusco Aero Rings
S—Coil Spring
T—Trombone

PONTOONS:
D—Duralumin
E—Edo
F—Fairchild
H—Hamilton
M—All metal
W—Wood

TYPE CERTIFICATE:
Apl—Applied for and is pending

GUARANTEE:
N—New

AIRPORTS AND AIRLINES

St. Louis to Have $2,000,000 Field

To Add 449 Acres to Present Field and Make Improvements

ST. LOUIS, MO.—The $2,000,000 airport bond issue has been passed by a vote of more than five to one. This assures St. Louis an airport that will be the equal of any now in use in this country.

Work on the flying field already has been started. The cellar of the control building, in which will be lodged the field's lighting and signalling machinery, has been dug and water mains have been installed at the expense of private aviation companies, which will be reimbursed with funds from the bond issue.

A 693 Acre Field

One of the first steps in the development of the airport will be the purchase of 449 acres, upon which Major Lambert, at his own expense, has obtained options assuring the city unusually low prices on the property. These will be joined to the present field to give St. Louis an airdrome of 693 acres with mile long runways, assuring planes of every size ample room for landing and takeoff.

The present field, now rented to the city by Major Lambert at $1 a year, is to be sold by Major Lambert for what he paid for it—about $135,000 which is much less than its actual value. The promise of Major Lambert and the options he has obtained, assure the city a price of about $650 an acre for its land. The low price of the land assures St. Louis more than $1,500,000 to spend for runways, buildings, grading and drainage and lighting the field.

Four Long Runways

One of the larger items in the budget prepared for expenditure of the bond issue funds is the runways. There will be four, 200 ft. wide and almost a mile long. Another major item will be the passenger terminal, which is to include a plane shed 200 ft. wide, where passengers may board their planes; a waiting room, restaurant, roof garden, control tower for the field dispatcher, and offices and will be at the southeastern corner of the field. Nearby will be hangars for the passenger and air mail planes. At the western side of the field there will be the control station and hangars and office buildings for commercial companies. The north side of the field will be the factory section.

July Mail Shows Gain of 5,000 Lb.

WASHINGTON, D. C.—According to figures made public here, an increase of 5,000 lb. in air mail carried was noted in July as compared with the June poundage, while compared with May figures, an increase of 15,000 lb. was noted. It is expected, furthermore, that the August poundage will exceed that of July by 25 or 30 per cent. because of the new five cent mail rate that became effective August 1.

Post office statistics showed the July poundage was 214,654 lb., the June figure 209,760 lb., and the May total 199,284 lb.

Boeing Air Transport, Inc., operators of the Chicago-San Francisco division of the transcontinental mail route continued to lead the other contractors in July in the amount of mail carried. Its total was 60,951 lb. National Air Transport's Chicago-New York route developed 55,752 lb. for second honors and the Salt Lake City-Los Angeles line of Western Air Express was third with 22,838 lb.

To Dedicate Defiance Airport on Labor Day

DEFIANCE, O.—Labor Day will mark the opening of the new 50-acre airport at Defiance and elaborate ceremonies have been planned for the occasion. More than fifty airplanes of various sizes and types are expected to participate in the events.

The new airport is located at the east limits of Defiance and is one of the largest largest level fields in the state. The east and west runway is 2,400 ft. long with diagonal runways of nearly equal length crossing at the center. The field comprises 29 acres owned and leased by the Simplex Aircraft Corp. and 21 acres owned by the Defiance Chamber of Commerce, the entire 50-acre tract being operated jointly for use of both the Simplex Company and the public.

Location of the buildings of the Simplex company at one end of the field provide engine, service and refueling facilities.

Newark Air Mail Base by October

Pitcairn, Colonial and N. A. T. Preparing to Move from Hadley Field

WASHINGTON, D. C.—Beginning October 1 an appreciable saving in time will be effected on air mail service to and from New York City by using the new Newark Airport as a terminal for lines radiating from New York and the metropolitan area. For nearly four years Hadley Field, N. J., which is approximately 45 mi. from Manhattan Island, has been used for this purpose. The change was announced recently by Postmaster General New and is in accord with the policy of the Post Office Department that air mail fields be located as close as possible to the commercial center which they serve.

Much Time to Be Saved

At present, the Overnight air mail from Chicago reaches Hadley Field at 4:45 A. M. but it is 6:43 A. M. before the train carrying this mail reaches the Pennsylvania station in New York City. Under the new plan the overnight plane will reach the Newark airport at 4:45 A. M., and 35 min. later the mail it carries will be in the hands of employees of the New York City post office for distribution and delivery to the addresses in that city and contiguous territory.

Outgoing dispatches of air mail over the New York-Chicago overnight route at present leave the Pennsylvania Station at 8 P. M. By using the Newark airport it will be possible to leave the New York City post office at 34th St. and Seventh Ave. at 8:40 P. M., resulting in a later closing time of almost an hour. It will also result in later closing times at the City Hall Station and other downtown stations in New York City.

Inform Lines of Change

National Air Transport, Inc., holders of the contract for the overnight New York-Chicago route; Pitcairn Aviation, Inc., operating the New York-Atlanta air mail service, and Colonial Air Lines, Inc., which has the New York-Boston contract, have been informed of the change. These companies are now making arrangements for the removal of their equipment to the new airport.

Chicago-Atlanta Line Contracted

Interstate Air Lines of Chicago to Fly Mail On New Route

WASHINGTON, D. C.—Interstate Air Lines, Inc., of Chicago, Ill., has been awarded the contract for the new air mail route between Chicago and Atlanta, which is expected to become one of the important parts of the system. The line is 790 mi. long and the bid accepted by Postmaster General New was 78 cts. per lb. It is stipulated in the contract that operation must begin within six months from the date of award, but it is possible that the Postoffice Department will require operation before the expiration of that time on account of the increased traffic resulting from the new five-cent rate.

Scudder Heads New Company

Lawrence W. Scudder of Chicago is president of Interstate Air Lines, and Robert T. Sherman is secretary treasurer. The company was not the lowest bidder for the contract. A bid of 65 cts. per lb. was received but not accepted.

The route runs from Chicago to Terre Haute and Evansville, Ind., Nashville and Chattanooga, Tenn., and Atlanta, Ga., with a spur from Evansville to St. Louis, Mo. It will make connection at Atlanta with the Atlanta-New Orleans route and with a route to be established from Atlanta to Miami. Connection will be made at Chicago with the St. Paul-Minn. route, with the route to Kansas City, and the far west, and with the route connecting important points in Michigan.

Making Lighting Survey

If it is necessary to begin operation before the expiration of the six-month period the route will be placed in day-time operation until the Department of Commerce shall have completed the lighting of the air way for night flying. The survey for the lighting is nearly completed, but the lights probably will not be installed in less than six months.

The schedule which will go into effect when the lighting equipment is installed is as follows:

DAILY SCHEDULE

(Central Time)

Southbound				Northbound
9:30 P.M.	Lv.	Chicago, Ill.	Ar.	4:50 A.M.
11:20 P.M.		Terre Houte, Ind.		3:10 A.M.
12:35 P.M.	Ar.	Evansville, Ind.	Lv.	1:50 A.M.
10:55 P.M.	Lv.	St. Louis, Mo.	Ar.	3:30 A.M.
12:40 A.M.	Lv.	Evansville, Ind.	Ar.	1:45 A.M.
2:20 A.M.		Nashville, Tenn.		12:05 A.M.
3:40 A.M.		Chattanooga, Tenn.		10:45 P. M.
4:50 A.M.	Ar.	Atlanta, Ga.	Lv.	9:30 P.M.

Summit Air Club Opens Ohio Field

AKRON, O.—The Summit Aeronautical Club has opened a flying field near Copley, on the Cleveland-Massillon road. A workshop and hangars are to be completed shortly, and plans have been made for a colonial style club house. The new airport will have six runways. Lighting equipment will include three flood lights, a rotating beacon light, and red and green lights strung alternately around the field.

S. J. Dinnin, president of the new flying club, is to have charge of the field. Dinnin, who has been engaged in aeronautical activities in Akron for the past year, formerly was with the Airport Service Transportation Co., Inc., of Chicago.

The new airport is to be a center of the usual aeronautical activities. The club plans to offer a flying course at its aeronautical school, and to maintain commercial flying service to Cleveland and Columbus.

Robertson Passenger Line Opens August 20

ST. LOUIS, MO.—The Robertson Aircraft Corp. here has just received two Ford-Stout monoplanes which, starting August 20, will be used in the regular pasenger and mail service between Chicago and St. Louis. The first of these planes brought down from Detroit by Harlan E. "Bud" Gurney, chief air mail pilot, and Dan Robertson, recently returned from a successful flight in the Ford Reliability Tour. H. L. Russell of the Ford Motor Co. also occupied the control cabin.

The time schedule for passenger service on the route will be as follows: leave St. Louis 9 A. M., arrive Chicago 12 M., leave Chicago, 3 P. M., and arrive St. Louis, 6 P. M. In addition the mail planes will leave at their regular time of 4:15 P. M. to return the next morning at 6 A. M.

In order that the Ford-Stouts may not remain idle on Sundays and holidays, a plan of regular sight-seeing trips is being developed by H. J. McNally, traffic manager.

No Hangar Bids Received

HELENA, MONT. — City Engineer Thomas Bogy failed to get a single bid for construction of a hangar at the city airport when bids closed recently. He will again advertise. Fred A. Sheriff, R. E. Towle and W. G. Ferguson compose the airport committee.

Schedules Announced For L. A.-Dallas Line

PHOENIX, ARIZ.—Schedules for the Los Angeles to Dallas passenger and express service to begin November 1 were definitely announced here recently by Jack Frye, president of Standard Air Lines, Inc., which is behind the project. Time from Los Angeles to Dallas will be 12 hrs., about one-fifth of that consumed by the fastest train. Contemplated stops are Phoenix, Tucson, Douglas, El Paso, Sweetwater, Abilene, Fort Worth, and Dallas. Planes will leave Los Angeles daily at 8 A. M., Pacific time, and arrive at Dallas at 11 P. M. Central time. Westbound planes will set out from Dallas at 8:10 A. M., Central time, and reach Los Angeles at 6:10 P. M., Pacific time. Time will be allowed for lunch at El Paso, Tex.

Next spring a feeder line will be extended from Douglas, through Nogales, Hermosillo, Guyamas, Cajeme, Navajoa, San Blas and Culiacan to Mazatlan, tapping some of the richest sections of Mexico.

Seven special Fokker cabin monoplanes powered with 525 H.P. Hornet engines, are already under construction for the new service. These will have a speed of 135 m.p.h., and will carry two pilots and eight passengers. The Standard Airlines will operate the longest commercial passenger line in the United States. Officers are Jack Frye, president; Paul E. Richter, Jr., vice-president; Walter A. Hamilton, vice-president; E. R. Chisholm, secretary, and Nathan Newby, legal advisor, all of Los Angeles.

New Portland-Medford Line

PORTLAND, ORE.—A daily passenger service connecting Portland, Eugene, Roseburg and Medford, Ore., has just been announced by Charles V. Eakin, president of Union Air Lines, for which the West Coast Air Transport is the operating company. The service will be started within the next three months, Mr. Eakin said. Single-engined Super-Universal Fokker planes will be used. The present route of the West Coast company's tri-engined Bach planes between Portland and San Francisco, but the big planes stop only at Medford.

Fort Dodge Field Dedicated

FORT DODGE, IA.—Twenty-seven planes, including Army craft from Selfridge Field, Michigan commanded by First Lieut. J. H. Cannon; Chanute field, Ill., and Fort Crook, Neb., participated in the recent dedication of the municipal airport, a mile east of this city. The port is under the sponsorship of the Junior Chamber of Commerce and W. B. Swaney, "grand old man" of Iowa aviation, was in charge. The new port has a runaway of over 2,000 ft. in all directions.

Vote $1,000,000 for Kansas City Airport

KANSAS CITY, MO.—A bond issue of $1,000,000 has been voted by the people of Kansas City for the purchase and improvement of an airport. The airport will be the same field now operated by the city under a lease and is located "in the bend" of the Missouri River, just north of Kansas City. It contains 687 acres. The city will pay $892,000 for the field. Improvements, costing as much or more than the $108,000 remaining from the bond issue, will be started at once. These improvements, according to H. F. McElroy, city manager, will include an air depot, modeled after the station on the Detroit field. It will include all modern facilities for both passengers and pilots and for the field officers. Concrete taxi ways also will be constructed and the field better drained and graded. A new concrete roadway also will be built to connect the field with the Hannibal bridge, across the Missouri River. Negotiations have been completed for lifting the tolls of the bridge.

Mr. McElroy said additional hangars will be built on the field as needed. The city already has spent more than $100,000 in improving the field and three hangars now are on the field. It is expected that the government will cooperate in the building of dikes to prevent any overflow of the field in the event of unusually high waters.

Sabine Firm Acquires Field at Port Arthur

BEAUMONT, TEX.—The Sabine Airways, Inc., operators with headquarters at the municipal airport here, have leased a landing field 3,000 ft. square at Port Arthur, Tex., and will maintain a school and passenger service there, according to an announcement by C. C. Scott, manager of the company. Jack Squire, who recently formed a connection with the company, will be manager of the new branch.

The Sabine Airways, Inc., a subsidiary of the Orange Car & Steel Co., of Orange, Tex., hangar manufacturers, is lessee of the municipal hangar at the Beaumont airport, and will also take over the operation of the municipal airport at Orange when it is completed the latter part of August. Arrangements have also been made for a branch of the school operated by the company to be maintained at the Houston municipal airport.

The company holds a Waco agency for Southeast Texas and is using that type of plane in its passenger carrying and instruction work.

Oakland Field Has 55 Planes

OAKLAND, CALIF.—A new "ordinary business" record has been set at the Oakland municipal airport. A recent check revealed that 55 planes are in regular operation at this field.

Mills Field Has a Big Traffic Gain

SAN FRANCISCO, CALIF.—The July report of business at Mills Field, San Francisco's municipal airport, just completed, shows a gain over June of approximately 55 per cent. in flights and landings and 70 per cent. in passengers, with a total of 1,906 flights and landings and 3,709 passengers. The June figures covered 1,298 flights and landings and 2,203 passengers.

July was by far the biggest month at Mills Field since it opened for business 15 months ago. The past month also marked the end of the experimental stage of Mills Field as a public ownedship enterprise and by unanimous vote of the Board of Supervisors the airport is now established as a permanent utility owned, controlled, and operated by the City of San Francisco.

Dedicate Stout Field With 10,000 Attending

AUSTIN, MINN.—Elaborate ceremonies marked the opening recently of Stout field, Austin's new municipal airport, named for William B. Stout, head of the Stout Airplane Corp., a division of the Ford Motor Co. and a former resident of Austin.

The dedication was held during the state convention of the American Legion, and was attended by 10,000 persons. Six planes from Selfridge Field, Mich.; two pursuit planes from Shamute Field, Rantoul, Ill., and several planes of the 109th Aero Squadron, stationed at Minneapolis, took part in the maneuvers which featured the dedication. Mr. Stout flew to Austin from St. Paul in a Ford tri-engined plane of Jefferson Airways, Inc., operating passenger service from the Twin Cities to Rochester, Minn.

The field will have two runways 3,000 by 1,000 ft., one of which is already completed. New hangars and other airport facilities will be installed in the near future.

Opens Hotel Air Service

CHICAGO, ILL.—The Central Airways Corp., Chicago, Ill., has made arrangements with the Hotel Baker, St. Charles, Ill., to provide airplane service between Chicago and the hotel. Guests at the hotel will have a plane available for their use upon call. Many members of the Hamilton Club, Chicago, are expected to avail themselves of the service August 29, when the organization holds its annual picnic at Pottawatomie Park near St. Charles.

Special Lighting For Coast Route

Seattle-San Francisco Airway to be Completely Lighted by Winter

PORTLAND, ORE.—The Seattle-San Francisco airway will be completely lighted within four or five months, according to S. S. Boggs, airway extension superintendent for the Department of Commerce, who has arrived in Portland to supervise the survey and installation work. Work will be started immediately on the Portland-Seattle section, the first on the schedule.

The Department plans the establishment first of landing fields at least every 25 mi. along the route. As many as possible of the municipal fields along the way will be utilized. Where they are not available the government will lease lands, Mr. Boggs said. In the rough mountain country which cuts across the coast route in several places fields will be set aside as close together as five miles.

Beacon Every 10 Mi.

In smooth, open terrain 3,000,000 candlepower, 24 in. revolving beacons will be set on 51 ft. towers every 10 mi. and at each landing field. Where the country is rough range lanterns of 500,000 candlepower will be installed between, on much higher towers if the country is timbered. On some sections of the airway these lanterns will have to be within three miles of each other, Mr. Boggs believes. All landing fields will have boundary lights 300 ft. apart.

The preliminary survey for the Seattle-San Francisco airway was made three or four months ago by A. P. Taliaferro, representing the commerce department.

The government lights will be augmented with beacons at principal cities planned by the Standard Oil Co. and a chain of lights to be set up every 50 mi. by the Richfield Oil Co.

Open 135 Acre Field At East Liverpool, O.

EAST LIVERPOOL, O.—Recently opened on the Lincoln Highway five miles north of East Liverpool, the new Chamber of Commerce Field comprises 135 acres. Improvements are being speeded, and a hangar being erected with servicing facilities for planes. The Koolmotor Flying Circus, operating Waco planes, carried many passengers during its two-day engagement at the dedication of the field.

FOREIGN ACTIVITIES

Civil Aeronautics Regulated in Cuba

Governing Body to be Appointed in Section of Army General Staff

HAVANA, CUBA—Cuba, having formulated its own rules and regulations governing civil aeronautics, is preparing to establish an aviation bureau in the information section of the army general staff. This step is a result of the rejection by Cuba of the International Convention for Air Navigation of 1919.

The proposed aviation bureau will handle all matters concerning civil aeronautics. The regulations will be interpreted and explained by a body known as the aeronautical commission and attached to the aviation bureau. Three members of the army and marines will be appointed by the secretary of war and marines and will constitute the commission. These members will be chosen from the Air Service, Auditing Service and General Staff of the Navy.

Commission to be Active

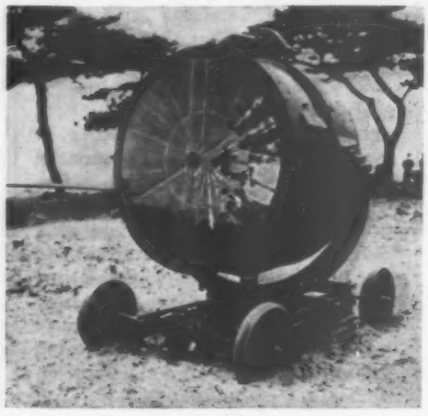
The commission will obtain and publish information on national and foreign air navigation. It will examine and approve documents, make examinations and tests on planes and equipment when permission is solicited for flying over national territory and will regulate the investigation, classification and examination of persons desiring to fly. It will also dispense information requested by individuals or groups interested in establishing, factories, airports and airlines on prices, rates, insurance and other matters pertaining to air transportation and service.

Aircraft will be divided into two general groups, official and private. The aviation commission will keep records of planes constructed, approved and imported and of pilots, mechanics and aviation instructors. The commission will inform the aviation bureau of all matters handled by the commission.

Metalurgists to Germany

LONDON, ENG.—The Council of the Institute of Metals has accepted an invitation from the Verein deutsche Ingenieure and the Deutsche Gesellschaft fuer Metallkunde to hold next year's autumn meeting of the Institute in Germany. The meeting will take place in Dusseldorf. It is expected to prove very attractive to the hundreds of members.

For Jap Defense



Showing one of the large portable field searchlights used by the Japanese in recent aerial defense maneuvers at Osaka.

International Opens New Survey Division

OTTAWA, CANADA.—A new aerial survey division of the International Airways, Canadian branch, has been established in Ottawa, where the office is located and where the flying headquarters has been established. At the present time survey work is being carried out with two Wasp powered Fairchild cabin monoplanes. It is thought that some time in the future air taxi service between Ottawa and other principal cities in the east will be established. The International Airways, formerly Elliott Air Services, with headquarters in Hamilton, Ont., has been reorganized, and Maj.-Gen. J. H. MacBrien, former chief of general staff in the Department of National Defence, and president of the Aviation League of Canada, has been named managing director. The company at present operates schools at Hamilton, Toronto and Montreal, in addition to the new division at Ottawa.

Giant "Romar" in Test Flights

TRAVEMUNDE, GERMANY—Test flights are being made here in the newly assembled "Romar," the huge flying boat built by the Rohrbach Metal Airplane Works of Berlin for transoceanic service. According to reports of the first flight, the giant metal rose into the air after a 250 yd. run. Pilot Steindorf, who flew the craft, reported that the Romar showed a fine performance in this initial 15 min. flight. Three B.M.W. engines developing a total of 2,400 hp. power the flying boat.

Large Increase Noted In Russian Air Traffic

MOSCOW, RUSSIA—A three fold increase has been noted in commercial air transport volume in Soviet Russia from 1924 to 1927, according to an announcement recently made public. Figures for 1927 show a total of 7,000 passengers and 160,000 kilograms of mail carried. During the year 2,392 trips were made and the distance covered was more than 1,100,000 mi. Prior to Aug. 1, 1927 a distance of 2,800 mi. had been flown by Soviet commercial planes.

Airplanes have also been put to other uses including crop dusting, photography and scientific research. In 1927 Soviet planes dusted 77,000 acres of locust infected lands and 6,000 sq. mi. of territory was photographed, for forest surveys, map making and other purposes. A 6,800 mi. flight has been planned for scientific investigation in the Arctic regions and will be made by the hydroplane Soviet North. Stops will be made at sixteen points during the flight.

Commercial airports have been established at Moscow, Smolensk, Velikye Luky, (near Leningrad), Kharkov, Rostov-on-Don, Mineralne Vody, Vladikavkaz and Baku.

U.S. Firms at Paris Show

PARIS, FRANCE—A preponderance of monoplanes, air cooled engines, and all metal trends in construction was noted at the 11th Salon de l'Aviation held recently at Paris. Two American companies were directly represented at the show, these being the Fairchild Aviation Corp., which displayed the Caminez engine and photographic pieces, and the Irving Air Chute Co. Fifteen other American organizations were represented by photographs on display at the American Aeronautical Chamber of Commerce booth. Distributors and local branches of four American oil, paint, and spark plug firms had accessory exhibits.

Club Gets Third Moth

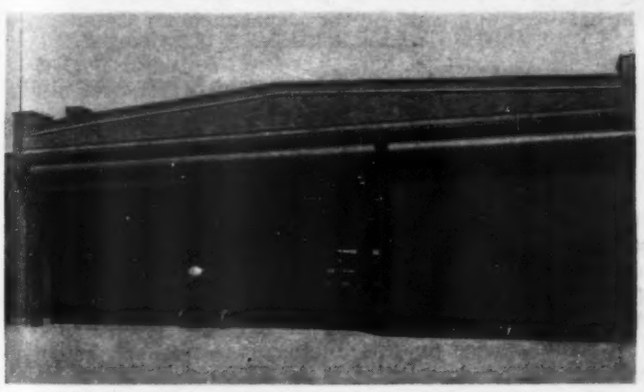
MONTREAL, CANADA.—The Montreal Light Aeroplane Club, through a public subscription campaign for $75,000, has been able to purchase its third De Haviland "Moth" plane. The first two machines were given to the club by the Dominion Government in accordance with the plan to promote flying clubs in the larger cities of the country. The plane was delivered by Leigh Capreal, chief test pilot for De Havilland at Toronto.

THE BUYER'S LOG BOOK

Kinnear Hangar Door

THE KINNEAR hangar door, produced by the Kinnear Manufacturing Co., of Columbus, O., has been in use for a number of years. The doors are made in the form of flexible curtains which coil overhead in a very small space. They are constructed in units approximately 20 ft. in width and of any required height with sliding posts between them. When the opening is to be cleared the posts are moved aside.

Kinnear doors are either hand or motor operated. Both types are mounted on the face of the wall either inside or outside the hangar. The curtains travel in guides attached to the sides of the separating posts and to the end walls of the hangar. Motor operated doors are provided with one or two power units controlled by push button switches. The doors may be stopped at any point in



Hangar with Kinnear Door.

their line of travel and held there indefinitely. A limit switch is provided which cuts off the current at a certain point in the travel of the curtain and immediately a magnetic brake is automatically applied.

Where the Kinnear door is to be used consideration must be given to the truss on which it is to be mounted so that the truss will carry the load. The curtains are made of semi-flexible slats rolled from copper bearing steel and heavily galvanized by the hot process. The doors are designed to withstand the full pressure of high winds. All parts are interchangeable and may be easily replaced in case of accidental damage. The entire equipment is trouble proof and practically automatic in operation.

Hyb-lum Alloy

THE SHEET Aluminum Corp., of Jackson, Mich., has recently placed on the market a balanced aluminum alloy that is fundamentally new in composition and in application to a wide variety of products. The new alloy is known by the registered name of Hyb-lum.

Research and experimental work on the alloy was done by Victor N. Hybinette, Jr., with the advice and assistance of his father, who is an officer of the Sheet Aluminum Corporation and an international authority on non-ferrous metals.

Prior to the introduction of Hyb-lum, the alloying elements of aluminum were chiefly copper, manganese, silicon and magnesium. Hyb-lum departs largely from these elements, employing instead nickel and the metals of the chromium group. The total addition of all heavy metals is approximately two per cent.

Among the outstanding qualities claimed for Hyb-lum are color, non-tarnishing, non-corrodibility, resistance to inter-crystalline corrosion, chemical resistivity, welding quality, strength and plasticity, non-fatigue, low specifi gravity, wide limits of temperature in heat treatment, and stability after heat-treatment even at elevated temperatures.

Hyb-lum has a pure white color like that of silver and without the grayish blue cast of aluminum. It is manufactured in four different classes designated A, B, C, and D which differ in physical properties but are virtually the same in composition. Hyb-lum products comprise flat coiled and strip sheets, sheet circles, extruded structural and special shapes, mouldings, bars and rods; wire and rivets, stampings, screw machine products and forging. All of these can be furnished heat treated.

Oxweld Portable Unit

A COMPLETE portable welding and cutting unit is now being produced by the Oxweld Acetylene Co., whose New York Offices are at 30 E. 42nd St. This unit is a highly useful addition to Airport equipment and is invaluable for emergency repair work and for general purpose work which does not require that both the welding and cutting blowpipes be used simultaneously. The oxweld Co. is a unit of the Union Carbide and Carbon Corp. and has offices in all principal cities of the United States.

Unit Mounted on Truck.

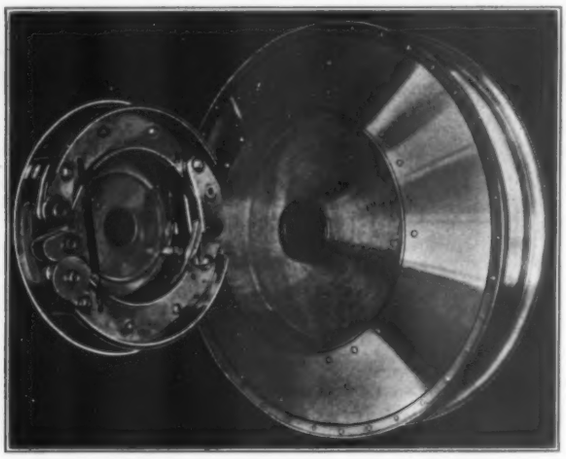
The unit is mounted on a two wheel hand truck and is sufficiently large to accommodate the oxygen and acetylene tanks. The same blowpipes are used as though acetylene were supplied by a generator and the same character of work can be done with the unit. The equipment supplied includes one Type C-14 (or C-6) cutting blowpipe with nozzles, lighter and wrenches; one Type W-1 Welding blowpipe with five welding heads, lighter and wrench; one Type R-27 oxygen regulator with 3000 lb. guage and 400 lb. guage and No. 24 wrench; one Type R-14 acetylene regulator with 350 lb. and 30 lb. guages; one 25 ft length of ¼ in. oxygen hose and one 25 ft. length of ⅜ in. red acetylene hose with the necessary clamps and one pair of goggles are also furnished. Extra lengths of hose in multiples of 25 ft. can be added as desired. An instruction booklet and pressure chart are also supplied.

Oxweld apparatus has passed the rigid and exacting examinations of the engineers of the Underwriters'

Laboratories, Inc., under the direction of the National Board of Fire Underwriters. A nation wide organization of thoroughly competent service engineers is at the disposal of users or prospective users of Oxweld apparatus. A complete catalogue of Oxweld equipment will be sent on request to any of the branches of the company.

Bendix Brakes

ONE OF the important steps in the development of aircraft has been the incorporation of brakes to reduce landing run and contribute to the ease of control of planes on the ground. The Bendix Brake Co., of South Bend, Ind., is now in production on complete units consisting of wheel and brake for airplane use. The company is prepared to supply any of the most used sizes



Bendix-Laddon Unit with cover opened showing brake assembly.

of wheel on short notice and will supply brake assemblies alone to constructors of other types of wheel.

The Bendix-Laddon unit is of maximum strength and minimum weight and is built in streamline form. The rim is standard as given in the U. S. Air Corps specifications which are also used as a basis for axle diameter and length. The unit consists of a disc wheel with a backing cover upon which the brake itself is mounted. The brake is of the well known two shoe Servotype, which has been used for several years on some of the best known makes of automobile. It is extremely powerful and at the same time perfectly controllable, a minimum pedal pressure being required to obtain full braking effect.

Adjustment of brakes is simple and can be made entirely from the outside of the unit. Ample provision has been made to take the thrust in the wheel by the use of specially constructed thrust bearings. The wheel unit is watertight and the valve extension used enables the operator to utilize the standard 45 deg. airplane valve so that no special parts need be carried along. All parts of the unit are made of high duty aluminum alloy except the springs, anchor pin and camshaft.

Shakespeare Controls

A WIDE selection of controls for choke, radiator shutter, heater and other purposes is offered by the Shakespeare Products Co., of Kalamazoo, Mich. Shakespeare controls are of the type employing a stiff wire sliding in a flexible tube and actuated by a plunger rod. A similar control actuated by a lever is also made by the company. The Shakespeare line has been designed with interchangeable parts so that more than 50 combinations of standard plunger and face plate paterns are available for quick delivery. Specially designed controls to fulfill the requirements of manufacturers are also produced by the company.

Shakespeare controls are well constructed, having brass push rods, knobs and body tubes for the push pull types.

Special connector head used to adapt tube and wire to solid rod control.

Flexible tubing and control wires are made to special formulae to prevent crystallization and breakage. All face plates are cut from brass. Push pull types are installed without the use of screws or bolts and are made up in standard throws of 1¼ in., 1¾ in. or 2¼ in. The diameter of the standard face plate is ⅞ in. All tubes are threaded ⅜-24 S.A.E. Special care has been taken to prevent rusting of wire and inside of flexible tube and construction has been approved by the Department of Commerce.

The Aero Corporation of California

(*Continued from page* 533)

engined Fokker Universals, seven Fokker planes, equipped with Pratt and Whitney "Hornet" engines, will be placed in operation November 1, when an extension of the line through Douglas, Ariz., El Paso, Sweetwater, Abilene, Ft. Worth to Dallas, Tex., will be opened.

A daily service on this extension is planned. Planes will leave Los Angeles at 8 A. M. and Dallas at 8:10 A. M., making the run between these cities in 13 hr. The approximate traveling time by rail is 60 hr.

The aviation line has been incorporated as Standard Air Line. Mr. Frye is the president, Mr. Richter and Walter

Personnel of Aero Corporation of California

Hamilton are vice-presidents, and E. R. Chisholm is the secretary of the new corporation. Nathan Neby is the attorney.

It is planned next spring to further extend the line with the institution of a branch from Tuscom, Ariz., to Mazatlan, Mex. The proposed route will run through Nogales, Ariz.; Hermosillo; Guaymas, situated on the Gulf of California; Cajeme, Navajoa, which is located on the Rio Mayo; San Blas and Culican, Mex.

Whenever the present route is government lighted for night flying the company plans to inaugurate a night service which would probably be extremely popular with

certain classes of patrons such as actors and salesmen.

Present equipment at the Los Angeles terminus consists of a perfectly graded and drained field four miles from the heart of town and on a main boulevard. Two runways are provided, the east-west runway being 500 by 1600 ft. and the northeast-southwest runway 300 ft. wide and 1800 ft. long. A slope westward of one foot in 30 is of great assistance to planes taking off on the northwest runway. A very great deal of hangar space is available at the field, one hangar alone being able to house eight Eaglerock planes, and a special Fokker hangar is provided with tail skid track and truck for rapid handling. Waiting room, ticket counter, company offices, complete engine and machine shop with Wright Whirlwind testing stand is only part of the field equipment.

Three Intermediate Stops

Stops will be made on signal at Blythe, Desert Center and Palm Springs to pick up passengers. Each of these points boasts a fine airport and many stops are made at Palm Springs, a fashionable and popular winter resort.

At Phoenix an excellent field is provided at a distance of six miles from the business district. The field at Tucson is a 360 acre AAA airport only two miles from the business district. Terminal space is leased at both of these fields through Kirk Moore, secretary of the Tucson Chamber of Commerce, and Attorney H. B. Watkins. Taxi service at Los Angeles is provided by Aero Corp. cars, at Phoenix by the Hertz Drivurself System and at Tucson by Yellow Cab. This service is included in the regular fare.

Press and Club Cooperation

Passenger patronage over this line has been greatly boosted by the cooperation of Arizona newspapers and Chambers of Commerce, and by the Los Angeles Greeters Club. An interesting observation is that the great majority of passengers have been Arizona people flying to Los Angeles and back.

Tickets from Los Angeles are sold by all agencies, from Phoenix by the Hertz Drivurself Station and from Tucson by the Yellow Cab Company. The passenger

Pasadena as viewed from one of the Aero Corporation of California planes in flight from Los Angeles to Phoenix.

rates are $54 round trip or $30 one way between L. A. and Phoenix, $72 round trip or $40 one way, L.A. Tucson and $18 round trip or $10 one way from Phoenix to Tucson.

In addition to the passenger carrying a very important package and express service is provided with rates at $1.60 per lb. or fraction thereof between L.A. and Tucson. A delivery service direct to store or home is maintained at all terminals and if after three trials the party is not located the package will be returned to owner without additional expense. A constantly increasing volume of express matter is an indication of the business to be expected from this source when business men become aware of the convenience. This freight service has been helped by signing contracts with certain firms for

The Hotel Raymond, Pasadena, Calif., as seen from the air by passengers flying the Los Angeles-Tucson route.

a guaranteed minimum monthly poundage. Firms now so contracting are: Western Auto Supply, Los Angeles; Marine Oil and Refining Co. of Ariz.; Halstead Lumber Co., Phoenix; and the Union Oil Co. of Calif. The Red Arrow Messenger Service, Los Angeles, has acted as local freight agent.

The Aero Corporation of California was organized in February 1926 with the following officers:

Lieut. W. Jack Frye, pres., R. A. Edwards, vice pres., Paul E. Richter, Jr., treas., Charles W. Cradick, secty., and Walter A. Hamilton, 2nd vice pres.

Operating equipment at that time consisted of three somewhat dubious Jennies. At the present time there are seven Alexander Eaglerocks and two Fokker Universals in daily use with a force of 25 persons on the payroll. Aero Corp. planes now fly an average of 1800 mi. per day and have so far carried over 39,000 passengers without injury. This development has been accomplished by the original organizers of the Company without assistance of outside funds, and is the result of applying business methods to the operation of aircraft. The Aero Corp. took the Southern California distributorship for Alexander Eaglerocks in June 1926, the Northern just recently and the Southern California and Arizona agency for Fokker planes in April 1927.

The "Sign Carrier I"

(*Continued from page* 532)

of sign carrying, it may be used as a transport. A compartment has been furnished for baggage and air mail, and the cabin has been equipped with seats for the accommodation of 10 passengers. The plane is powered with three engines. A Pratt and Whitney "Wasp" engine is mounted in the nose, and two Wright "Whirlwind" engines are mounted in nacelles between the wings. These engines are equipped with hand inertia starters. In designing the nacelles for the outboard engines, sufficient

The AIRSEDAN

139 m. p. h.

By official test, the fastest ship in the Reliability Tour

Specifications

Weight Empty	1,800 lbs.
Wing Span	36 ft.
Wing Area	240 sq. ft.
Length	25 ft.
Useful Load	1,400 lbs.
Seating Capacity	Pilot and 2 Passengers

Performance

High Speed (Sea Level)	139.1 M.P.H.
Landing Speed	45 M.P.H.
Cruising Speed	115 M.P.H.

Power Plant

Engine	Whirlwind
Horsepower	200 at 1,800 R.P.M.
Fuel Capacity	90 gals.
Oil Capacity	5 gals.

Equipment

Starter, Brakes, Metal Propeller, Compass, Air Speed Indicator, Navigation Lights, Tachometer, Altimeter, Clock, Fire Extinguisher, Fuel, Oil Pressure, and Oil Temperature Gauges, Air Corps Throttles, Strainer and Fuel Valve, Exhaust Manifold, Cabin Heaters.

Manufactured Under Approved Type Certificate NO. 46

Price $12,000

Flyaway our Field, Marysville, Michigan

Buhl Aircraft Company
MARYSVILLE, MICHIGAN

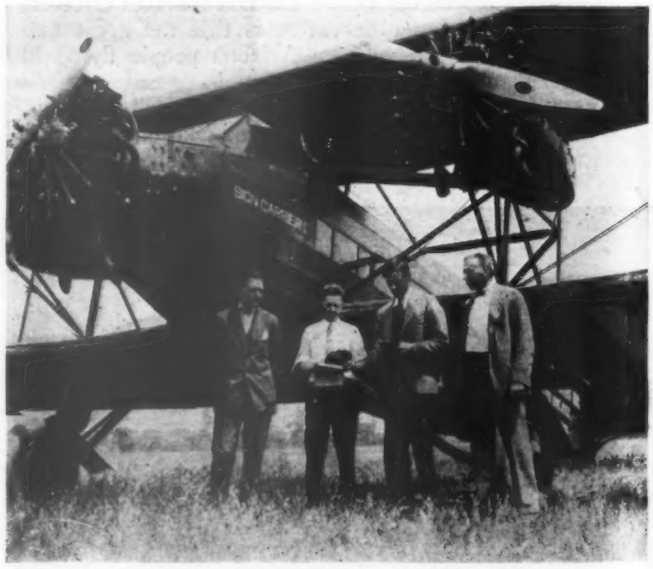
space was allowed so that two Pratt and Whitney Wasp engines could have been installed without overlap if desired.

With the two Whirlwinds and the Wasp engine, the plane embodies the same features of maneuverability and short-run landings and take-offs as does the Pathfinder. With a full load it has a high speed of 113 m. p. h. and a landing speed of 46 m.p.h. Its initial rate of climb is 750 ft. a min. Its range is 500 mi. Turning up 1,800 r.p.m., the three engines develop 875 hp. The fuel system has a total capacity of 350 gal. of gasoline. Dump valves, suitable for installation on a two inch line, are provided for both the main and auxiliary gasoline tanks, which hold 175 gal. and 145 gal. respectively. These valves are located where they may be opened and closed by the pilot. They allow the fuel to run out at the trailing edge of the wings when open. The oil system has a capacity of 33 gal.

Equipped With Pioneer Instruments

Among other features of the plane is a landing gear of the standard Army Air Service split axle type. The wheels have brakes and are also equipped with mudguards. The instruments selected were all manufactured by Pioneer Instrument Co., Brooklyn, N. Y. There are two altimeters, one of which is in the cockpit and the other in the cabin. There are two air speed indicators, three tachometers, three oil pressure gauges, three oil temperature gauges, one compass and one clock.

C. Gilbert Peterson, who was formerly connected with Wright Aeronautical Corp., is president of Aerial Advertising, Inc.; Roland Rohlfs, former holder of the world's altitude record, is vice-president of the Company. Charles L. Lawrence, president of the Wright Aeronautical Corp., and Col. Benjamin F. Castle, president of the N. A. A., are among the directors of the organization.



A group of officials of Aerial Advertising, Inc., and Keystone Aircraft Corp., conferring as they stand in front of the new Keystone "Sign Carrier I."

The specifications of the Sign Carrier are as follows:

Weight Loaded (as a Transport)	11,379 lb.
Weight Loaded (as a Sign Carrier)	10,169 lb.
Weight Empty (as a Transport)	6,894 lb.
Weight Empty (as a Sign Carrier)	7,094 lb.
Upper Wing Area	586 sq. ft.

Lower Wing (as a Transport)	554 sq. ft.
Lower Wing (as a Sign Carrier)	674 sq. ft.
Total Wing Area (as a Transport)	1,140 sq. ft.
Total Wing Area (as a Sign Carrier)	1,260 sq. ft.
Overall Length	44 ft. 4 in.
Upper Wing Span	75 ft.
Lower Wing Span	90 ft. 6 in.
Chord, Upper Wing	8 ft.
Chord, Lower Wing	8 ft.
Angle of Incidence, Lower	.5 Deg.
Angle of Incidence, Upper	5 Deg.
Stagger	None
Gap	110 in. to 97.8 in.
Dihedral, Upper Wing	.2 Deg.
Dihedral, Lower Wing	.2 Deg.
Tread of Hand Carriage	15 ft. 3 in.
Wing Loading (as Transport)	10 lb. per sq. ft.
Wing Loading (as Sign Carrier)	8.10 lb. per sq. ft.
Power Loading (as Transport)	13 lb. per hp.
Power Loading (as Sign Carrier)	11.6 lb. per hp.
Performance with Full Load:	
Full Speed (sea level)	113 m.p.h.
Landing Speed	46 m.p.h.
Initial Rate of Climb	750 ft. min.
Range	500 mi.
Power Plant	875 h.p. at 1,800 r.p.m

(2 Wright "Whirlwind" and 1 Pratt and Whitney "Wasp")

Crawford Metal Plane

(*Continued from page* 531)

four below with a false spar in the trailing edge. No ribs are used except a master rib at the inner end of each wing section, the completed wing being built in two halves bolted together at the center, and a bulkhead at the point three feet out from the center at which the brace struts from the body attach. A third bulkhead is used at the outer end of the wing in order that a built up wing tip of streamline form may be bolted on, thus shielding the ailerons and increasing the efficiency of the wing. False ribs are mounted every two feet along the top of the wing from the leading edge to the second spar in order to keep the wing curve from flattening out on top.

14 *Gauge Channel Section Dural Used*

Channel section duralumin of 14 gauge has been used for all spars, the dimensions being 1½ in. deep and one inch across the face. While drag and compression stresses are carried through the covering the spars are maintained in place by diagonal duralumin channels extending alternately from top to bottom spars. Since the wing taper causes the spars to converge appreciably these short brace members are of varying length throughout the wing. The leading edge is formed by laying two spread duralumin channel sections edgewise and riveting the top and bottom wing covering between them.

Ailerons are of 26 gauge sheeting riveted to dural tubing and mounted to the rear spar by three pin hinges along the lower side. Control is by push and pull tubes and flat dural is used to fair the ailerons into the wing curve at the joint.

Fuel supply is all gravity feed and is cared for by a 22 gal. gasoline tank mounted in the fuselage in front of the passenger cockpit and by two 15 gallon tanks, one mounted in the inner portion of each wing section. An 8 gal. oil tank is mounted in the fore part of the fuselage directly behind the firewall.

The wing is carried to the body by eight struts of

THE KEYSTONE "PUP"

Training Plane Development

THE DEVELOPMENT of suitable training equipment for the Navy has required years of concentrated effort on the part of Navy Specialists, coordinating with aeronautical engineers in the industry.

A striking reward for their combined efforts is afforded in the recently accepted Keystone "Pup," which has justly merited the enthusiastic comments heard from all sides.

KEYSTONE

KEYSTONE AIRCRAFT CORP. BRISTOL, PENNSYLVANIA

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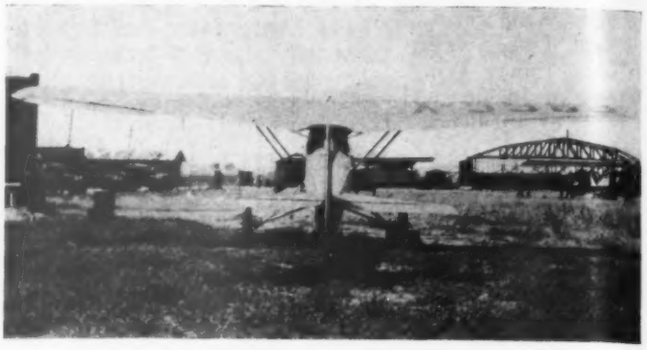
two in. round steel tubing. Four short struts extend from the upper longeron, two to a point at the center of the leading edge and two to the wing fittings at a point three feet out along the forward lower spar. Two long struts on each side extend from the lower longeron of the



The Crawford plane as it looks from the rear.

fuselage to the forward and rear lower spars respectively at a point three feet from the center of the wing. All fittings are of steel and all riveting at strain points where fittings are attached has been done with iron rivets. Other rivets throughout the plane are dural.

The excellent performance of this plane is said to be largely due to the variable incidence wing, which changes from two degrees at the center to zero degrees at the tips. The finish throughout the entire airplane, both externally and internally is two coats of gray engine enamel. The original tail skid was of the leaf spring type but this been changed to laminated tube with castor action and shock cord unit. All controls are push and pull tubes except the rudder which is operated by means of 3/32 in. steel wire.

The construction of the plane was carried on in a small back yard and within a 16 ft. garage. Originally started by Henry Laurich, who now owns the airplane, the final engineering and construction was done by Harvey Crawford. Much of the sheeting was shaped on home made wooden forms, a great deal of the bending and almost all

Side view of the all-metal Crawford plane.

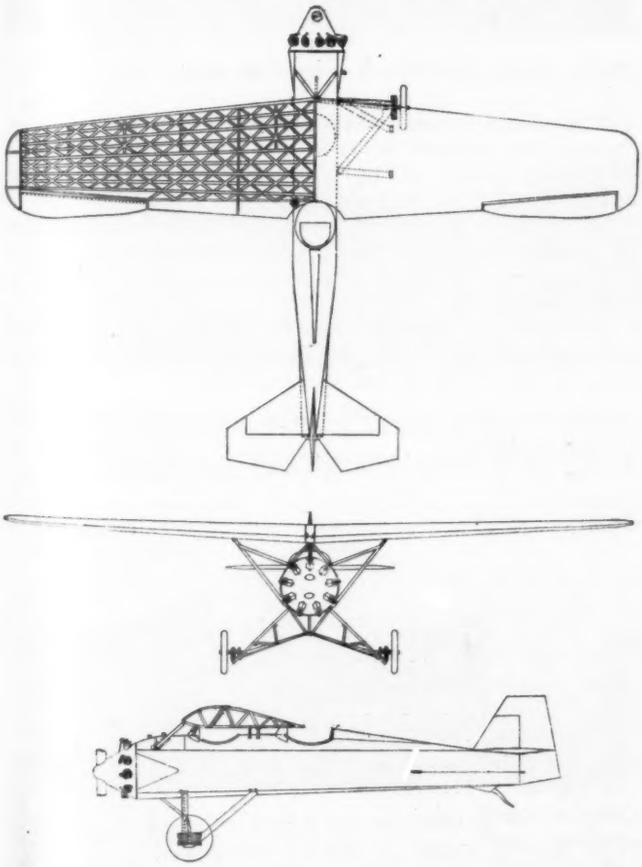
of the welding was done in the small garage, and the riveting was carried on by means of an air riveter supplied with pressure from a Ford operated air compressor. Many changes and delays were necessary during the time of construction, which extended over approximately an entire year due to the fact that neither Mr. Laurich nor Mr. Crawford could devote much of their time to the work.

The total cost of the plane, which is now said to have proved itself to be of practical design, is said not to exceed

$2700 and it is thought that this model could be produced for $500 less than that figure if built in quantities.

Mr. Crawford and his associates are so well satisfied with the performance of this plane that designs have been drawn up for three more of varying types but all based on the design of the Crawford Metal Plane No. 1. Production has already commenced on these three planes and it is said that the larger of the three, a six place cabin job is already sold. A company is being formed to exploit this type of all metal construction and Mr. Crawford has announced that a factory building will be taken over at once in order to rush completion of the new planes.

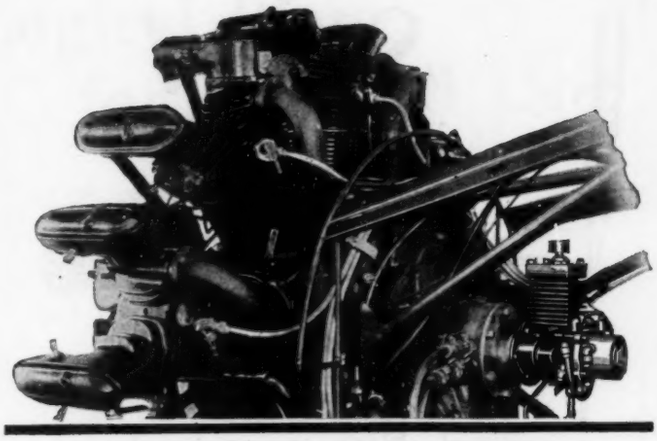
Several features of the planes now under way are of particular interest. The larger plane will employ tubular duralumin spars in the cantilever wing and will be equipped with external struts as an additional safety factor. It will have a copy of the wing used on the German Bremen with the up turned wing tips. The entire plane



A three view drawing of the Crawford parasol monoplane.

is designed close to the ground for slow landing, will be equipped with brakes and will carry two pilots in a forward cockpit similar to that in the Fokker. This plane will be equipped with hot and cold water and toilet facilities.

Of the small planes, one is to be a two place training plane to be available in either high or low wing design and to sell for approximately $2650 without engine. The other plane is of similar type but will be of four place design with a new passenger arrangement that merits the term Cabriolet by which it is to be designated. Two passengers will normally ride side by side in the enclosed cabin under the wing but should accommodations be desired for two more persons there is a convertible cockpit



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STARTER

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AUTOMATIC simultaneous with the touching of the Heywood Starter Button, rotation of motor at the necessary speed, compression, carburation, and ignition for positive starting is assured.

ADAPTABLE the Heywood Starter is manufactured for and particularly adaptable to all engines used in modern aircraft.

Complete details and specific installation data will be sent on request. Give make and model of motor for which starter is desired.

The HEYWOOD STARTER *Corp.*
6547 St. Paul Avenue, Detroit, Mich.

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—this new tie rod terminal

Tighten the lock nut as much as you will—you cannot hurt the terminal or break the tie rod. New, stronger, safer, better. Lock nut screws on to the terminal instead of on to the rod, avoiding torsional and tensile strains, giving closest thread fit. Write for detailed information. Macwhyte Company, 2905 Fourteenth Avenue, Kenosha, Wisconsin.

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Meyrowitz Luxor U. S. Air Service Model No. 6 (as illustrated)
Perhaps the most popular goggle on the market today. Adopted by the U. S. Air Service. Fine quality throughout, soft sponge rubber cushions, wide head band, adjustable bridge.....**$10.75 each**

Lamoglas "Companion"
Large wide vision lens with large snug fitting, wind proof, soft sponge rubber cushions, ventilated. Can be worn for hours without the slightest discomfort. Gives 100% vision.....**$8.50 each**

Protex Goggle Triplex Aviation No. 8125
Excellent side vision goggle with popular fabric cup, bound with silk chenille, sure fittinfi because of the double hinged nose piece—flexible frame makes the goggle fit the contour of the face **$3.00 each**

Resistal Goggle N. A. K.
Perfect formed fitting cups in fine quality fabric lining. Soft to the face yet snug and protective. This particular goggle is very popular with the commercial flyer. Non-shatterable clear vision lens. ..... **$4.00 each**
All repairs for every make of goggle, all types of lens, bands, cushions and minor repair parts.

OX 5 Engine Manual 25c

Nicholas-Beazley Airplane Co., Inc.
700 N. English Street
Marshall, Mo.

provided in the rear which may be reached by lifting a segment of the upper fuselage covering and unfolding the seat cushions which will be attached to it in a manner similar to that now used in the familiar automobile rumble seat. The passengers in the rear will be semi enclosed, being seated well down in the body of the plane. They

Front view of the Crawford Metal Plane.

will be able to converse with persons in the forward cabin through an aperture between and the rear cockpit is to be equipped with sliding glass windows for vision and ventilation.

Due to the efficient wing used and to the great strength of the structure employed it is said that these new planes will be a marked advance over the accepted commercial types now in use.

Specifications and performance figures on the Crawford Metal Plane No. 1 are given below as they were supplied by the designer and manufacturer.

Length overall	24 ft. 9 in.
Height overall	8 ft. 4 in.
Airfoil	German Junkers
Span	34 ft.
Chord	6 ft. 6 in. (max.) 3 ft. 3 in. (min.)
Area of wing, total	214 sq. ft.
Weight empty	1100 lb.
Pay load	1000 lb.
Disposable load	1800 lb.
Gross weight loaded	2900 lb.
Power plant	165 hp. Gnome rotary
Wing loading	13.7 lb. per sq. ft.
Power loading	17.6 lb. per hp.
High speed	148 m. p. h.
Cruising speed	130 m. p. h.
Landing speed	30 m. p. h.
Take off run	100 ft.
Landing run (without brakes)	300 ft.
Climb at sea level	1600 ft. per min.
Service ceiling	20,000 ft.
Gasoline capacity	52 gal.

Care and Maintenance of Siemens Engines

(*Continued from page* 530)

able lock nuts. Each cylinder is bolted to the crankcase with four large hold-down bolts.

The crankshaft operates the cam drum through an intermediate spur gear train. The roller tappets are carried in bronze bushings inserted in the aluminum alloy crankcase, and the hollow tappets contain a long spring which prevents the valve push rod from falling out in the event

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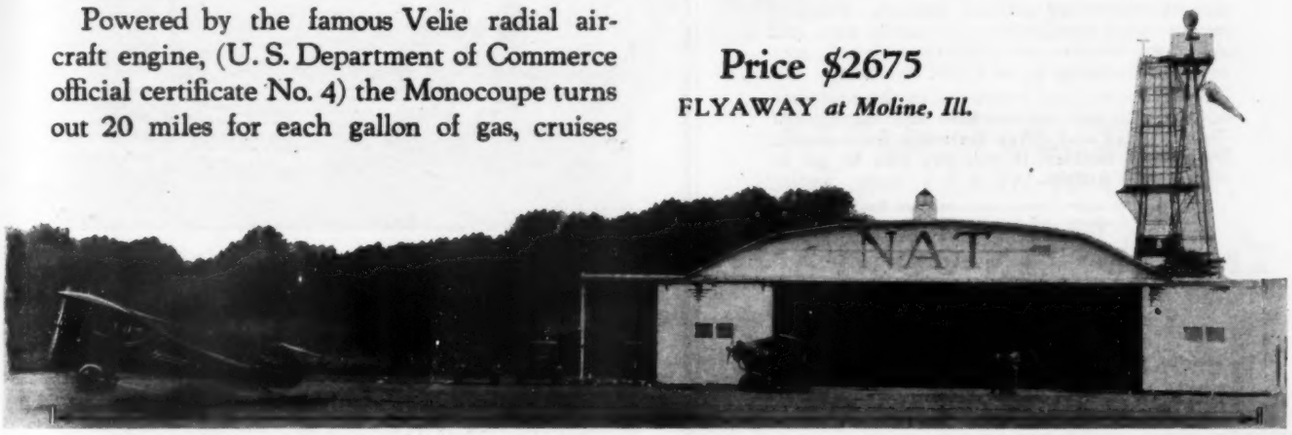

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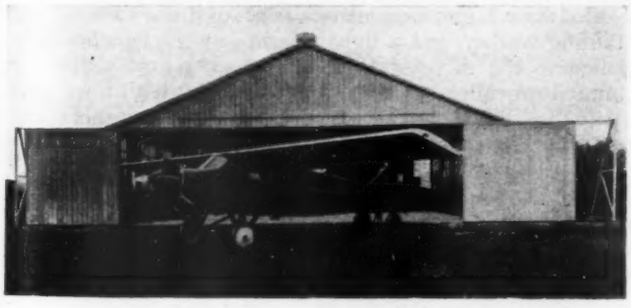

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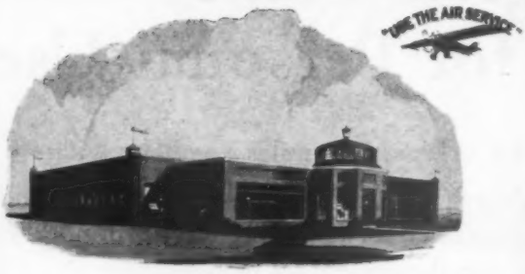

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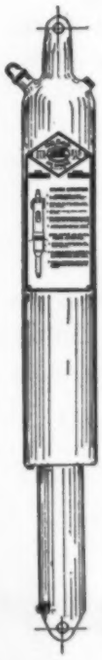

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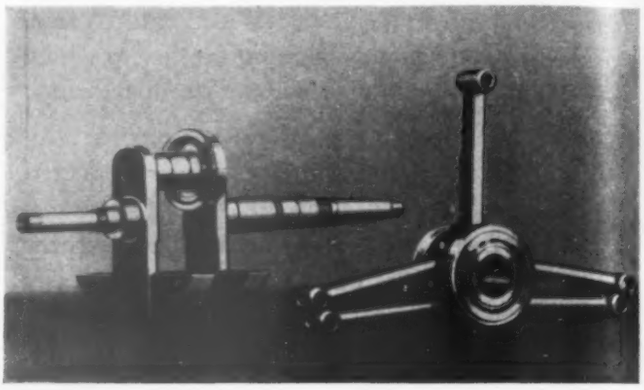
that a valve should become "sticky" and should cease to operate or follow the cam.

The valve timing should be as follows:

Inlet opens—6 deg. before Top Center—EO.
Inlet closes—48 deg. after Bottom Center—ES.
Exhaust opens—48 deg. before Bottom Center—AE.
Exhaust closes—6 deg. after Top Center—AS.
Ignition advance—34 deg—VZ.
Valve tappet clearance—.008 in. cold.

The letters given on the right are German markings stamped on the rim at the forward end of the crankcase, and should be used in timing the valves. The firing order



The balanced crankshaft of the five cylinder Siemens radial aircooled engine is shown at the left in this illustration. It is a chrome nickel steel forging, fully machined and hollow drilled. The connecting rod head of the same engine is shown at the right.

of the cylinders is 1-3-5-2-4 for the five-cylinder engine, 1-3-5-7-2-4-6 for the seven-cylinder engine, and 1-3-5-7-9-2-4-6-8 for the nine-cylinder engine.

In the normal servicing and care of the valves, rocker arms and valve action in general, the valve stems should be oiled with a gun or squirt-can through the valve spring retaining washer and a light-weight cup grease should be applied to the valve springs. The rocker arm shafts are mounted on roller bearings, and if packed with a medium cup grease will last for many, many hours without any attention whatsoever.

The oiling system is of the dry sump type. The oil is circulated at low pressure by a gear pump mounted on the crankcase. This pump is designed to that the scavenging gears have double the capacity of the pressure gears, thus insuring the complete drainage of the crankcase as fast as oil is thrown from the crankshaft and has lubricated the bearings, pistons, rings and so forth.

Oiling System is Different

The oiling system of this engine differs somewhat from the conventional design due to the fact that the oil pump gears rotate at one-eleventh of the crankshaft speed. The reason for this design is that one of the principal functions of the all-ball-bearing master rod assembly is that of lubricating the pistons, rings and waist pin. The oil is led into the crankshaft from the oil pump and then into a small tube. It is thrown from the tube by centrifugal force. It will be seen that it is not necessary with this design for the pressure to exceed one or two pounds.

Before starting the engine it is essential that the pilot observe that the shut-off valve from the oil supply tank to the pump is turned on. If the engine has been standing idle for any length of time, it will be advisable to use the auxiliary hand oil pump and feed an additional supply of oil to the engine through the warming-up period. The exhaust should emit a slight blue smoke before attempt-

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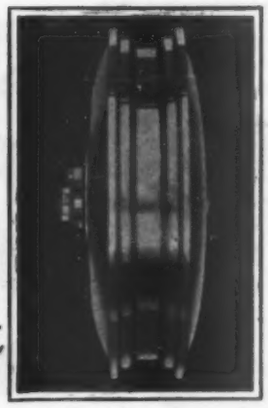

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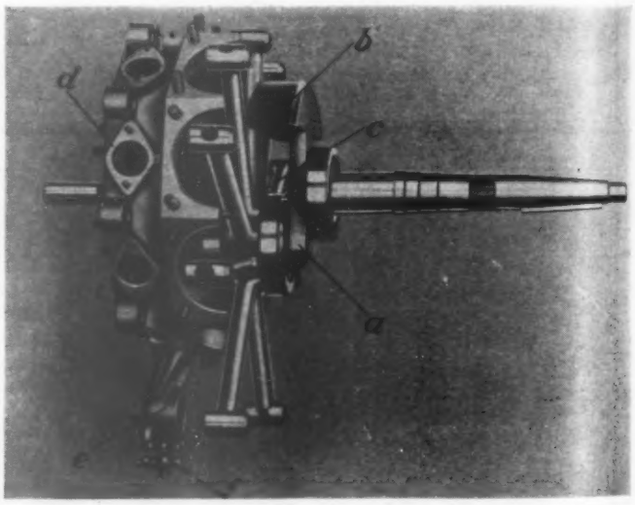
ing to take the plane off. This is very important. No trouble will appear in regard to lack of lubrication if this suggestion is followed.

One readily can observe that if the engine has not been run for several days, and then is warmed up hurriedly without working the surplus or auxiliary hand oil pump, that the engine will run for some length of time before sufficient oil will be circulated by the oil pump proper. It should be borne in mind that the pump operates at one-eleventh of the crankshaft speed, which is quite ample for perfect lubrication under normal operating conditions.

There is an oil strainer in the rear end of the crankshaft, which may be removed for cleaning by taking off the tachometer drive nut, which has a left-hand thread. The strainer will not permit any foreign matter to pass into the crankshaft, thus insuring a clean oil supply. There are two other oil strainers in the lubricating system. One located in the sump at the bottom of the crankcase, and the other is between the oil tank and pressure pump. These strainers should be cleaned about every 15 hr. If this is not done, circulation will be impeded and proper lubrication hindered.

Since the lubrication system is of an extremely low pressure type, and supplies only a limited amount of oil, the engine requires not only a very high quality of mineral oil, but oil having the exact specifications and characteristics as that recommended by the builders of the engine. The oil should have a flash point of between 460 deg. and 470 deg., a cold point with a 10 deg. maximum, viscosity



A view of the crank drive of the Siemens nine cylinder engine. (a) Crankshaft. (b) Counter weight. (c) Master rod. (d) Connection for suction pipes. (e) Oil sump. (f) Oil discharges.

of 90 to 100 at 210 deg. Fahrenheit and a carbon residue of not more than 1.5 per cent. Proper oil must be used. Otherwise the engine will run at a higher temperature than normal. Even if the lubrication is sufficient to prevent sticking, very serious results will occur in time, such as scorched cylinders or even cracked cylinder heads. Naturally, this will reduce the total life of the engine.

The carbureters used on these engines are simple in design, but very efficient. For easy starting it is advisable to prime the engine by filling the priming cup with a small amount of fuel or by connecting a hand primer in series with the manifold so that the engine may be primed conveniently from the cockpit. I will make several suggestions for adjusting the carbureter. If they are followed there will be no trouble in securing the maximum performance. The suggestions are as follows:

1. Check the throttle stop screws to see if they are

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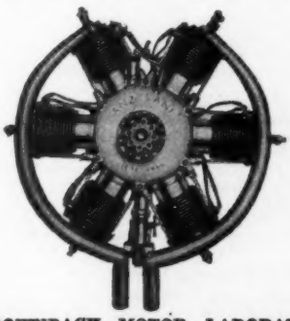

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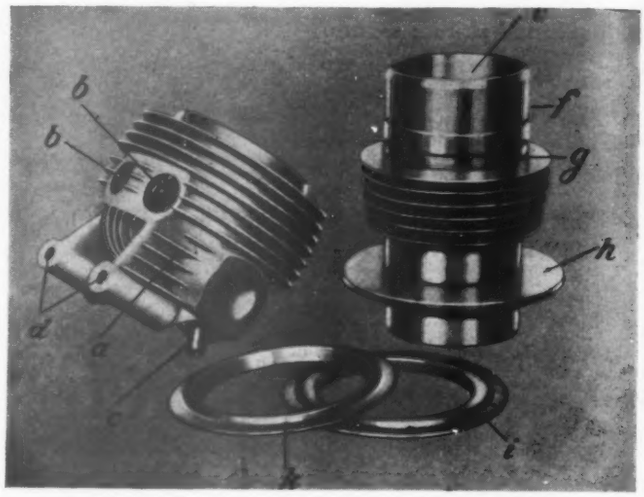
opened one-half turn from the closed throttle position.

2. Lift hold-down clamp and remove high-speed metering nozzle and air-bleeder assembly. The top square nut or air-bleeder can be used to produce a lean mixture. The numbers on metering nozzles indicate the quantity of gasoline which is being permitted to pass into the high-speed or main nozzle. In adjusting the carbureter, select a high number, or a slightly rich mixture, and work down.

Place the number selected on the air-bleeder in line with the air hole on the side of the main nozzle. Then install the main nozzle assembly in the carbureter with the selected number facing the motor, so that the number may be read when the hold-down clamp is in position. If



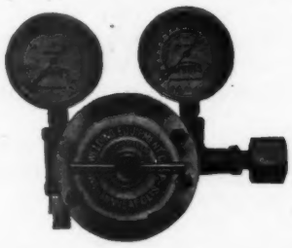
A disassembled cylinder of a Siemens aircooled engine; (a) Cylinder head of aluminum alloy. (b) Spark plug eyes with nut. (c) Valve Guide. (d) Bore holes for securing valve gear bridge. (e) Steel bush. (f) Thread for cylinder head. (g) Thread for counter-nut. (h) Fixing flange, unfinished. (i) Counter-nut. (k) Shrunk ring.

the main nozzle selection has been made, and it is found that the engine will turn up maximum revolutions, without any tendency to "spit back," the mixture can be altered slightly by changing the relation of the bleeder without moving the main jet. That is, the larger the hole in the air-bleeder selected with a given main nozzle, the leaner the mixture, or vice-versa.

3. It has been found by experiment with some fuels that it is necessary to make slight changes in the idling tubes, in order to obtain a rich enough mixture when idling to prevent the engine from stopping with the throttle completely closed. This is a very simple operation. It is accomplished by removing the idling adjustment tube on top of the main venturi and then removing the lock nuts. This will permit the screwing down of the idling tube into the main nozzle, and will materially richen the idling mixture. However, do not screw them so far down on idling adjustment so as to shut off the gasoline at high speed.

The engine should then be started. If the engine has a tendency to load up due to too rich a mixture while idling, screw up slightly on the idling adjusting tube until the motor idles with a slightly rich mixture. If this adjustment has been obtained, it is then possible to experiment with main nozzle selections for economy without affecting materially the idling performance of the engine.

In the case of the nine and seven cylinder engines, it should be borne in mind that any adjustment or change of nozzles in one carbureter should be followed through on the other.



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Specifications of the Material

(*Continued from page* 529)

The body of the specification is occupied, first, with a full list of the materials required, specifying their store numbers, sizes, characters, and quantities. Then, for each item of material or for the part as a whole, is specified each operation of labor, giving the drawing number, name of operation, list of tools required, either a description of what is to be done or reference to a standard instruction sheet, the rate of production to be expected for each man in the production group, number of pieces, and total time expected. The footing of the total hours scheduled for all men on all operations gives the total work-hours, while totaling the job-hours (not man-hours) scheduled for each operation gives the total scheduled time for the whole sub-assembly, as stated in the heading.

Office Copies to Show Costs

In the marginal columns at the right are extended the standardized costs of material, labor, and the burdens applying on them. These columns appear only on the office copies, and not on those that are issued to the shop. In the example shown, all the materials called for are raw materials, but such specifications are themselves units in larger groups and these again in still larger ones, until the final complete airplane engine is reached, so a great many specifications will call for parts already worked, as well as for raw materials.

So much for the form and data of the specifications; consider, next, their use, first in specifying material, and then in specifying labor.

Drawing Shows a Bill of Materials

When information as to materials required can only be had by taking it from the working drawings, considerable time must be spent by someone to get it. This would be a wasteful process, if it had to be repeated every time a part is ordered, so in such cases it is customary for the drawing to show a bill of materials. Even when a part is to be made but once or twice, a bill of materials is desirable to insure against omissions and errors. Certainly no one is more competent to list all the pieces, bolts, screws, etc., than the draftsman who designed the part. Here, however, we run into another difficulty. Draftsmen are designers, not stock clerks. They change from time to time and their training varies. Unless small parts have been well standardized and limited, and unless lists of permissible standards are available to the draftsman and their use is enforced, he will call for any parts that suit his convenience. Moreover, different draftsmen will call the same thing by different names. These are causes of unnecessary ordering and multiplication of kinds of stock —both very undesirable.

Should Standardize Stocks

Stocks should be standardized, and limited strictly to those kinds and sizes which have been selected. The best way to enforce these standards is to have all materials censored by someone of mechanical experience, able to read drawings, familiar with the standards and the stock on hand, not a draftsman but a "bill-of-materials clerk." In a small establishment, he may combine other duties with these. Such a person will ordinarily save his wages several times over, through holding to standards and sticking to the use of materials that are available. He may,

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also, save the time of the draftsman, usually a higher-priced man, by relieving him of the labor of preparing the bills of material. When this is done, it is better to make these bills separate from the drawings. There are many advantages to be gained by so-doing. These will be apparent from the uses made of the specifications, which embody and extend the bills of material.

A Waste of Foreman's Time

But even when a bill of material has been correctly prepared, the materials have to be requisitioned from the stockroom, priced, credited on the stock-cards or ledgers, and charged to costs of the work. The writing of such requisitions is frequently left to the foreman or the workman. Even when he is able to copy them from existing bills of material, this is a wasteful plan, for it is requiring clerical duties of men. who are often rather poor clerks, are bothered by pencil work, do it huriedly and make mistakes. Moreover, their time is much more valuable in supervision or direct production. It does not pay to do pencil work in the shop. It may be laid down as a principle, that, on all work where the design has been settled in advance, on all, that is, except repair, experimental, or development work, the requisitions should likewise be prepared in advance by, or under the supervision, of the bill-of-materials clerk. These requisitions should then be issued to the shop with the order for the job, making unnecessary any pencil work on material requisitions by foremen and workmen.

Another advantage results: It now becomes easy to prepare a duplicate bill and give one copy, in advance, to the storekeeper. He is enabled to get these materials together in spare moments, often a day or two before they are required, and have them ready for the foreman's call. This saves a lot of waiting at the store-room window, with men and machines standing idle. The storekeeper is also enabled to get in supplies if he is running short, and so save hold-ups on the jobs. If special materials have to be purchased, the bill-of-materials clerk is also in position to start the "ball rolling" promptly.

Copied from Bills of Material

One method of preparing these pre-written requisitions is to have them copied by a typist from the bills of material. By having the blanks prepared in long, perforated strips of the "fan-fold" type, this may be done rapidly. In some cases, this is found desirable, but if the bills of material are prepared in proper form so that they can easily be multiplied in quantity by blue-printing or hektograph, they themselves may be used as the store-room requisitions, so effecting a considerable saving in clerical labor. When this plan is followed, the foreman and the storekeeper each receive a copy, bearing the number of the production order. The storekeeper gets the material ready and the foreman sends for it, either all in one lot, or for such items as he needs from time to time. As these are delivered, the storekeeper checks them off on his copy. He may get the foreman's signature if desired. When all have been delivered, the storekeeper sends his copy to the office to be priced, credited to stores, and charged to work in process. No other material than that called for on the bill of material may regularly be drawn out for standard production. If some of it is spoiled, and must be replaced, a special requisition is required, approved by some one in authority, who will inquire into the causes of the spoilage and place the responsibility. This plan does away with all requisition writing by foremen and workmen on standard work, and is the plan illustrated and recommended here.

* * *

Specification of Labor will be taken up by the author in another article, which will appear in an early issue.

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SIDE SLIPS

By Robert R. Osborn

The papers state that a recent bride, arriving on a steamer to New York, was welcomed by a shower of rice thrown by friends who went out to meet the ship in an airplane. We must point out again that it is a dangerous practice to use an airplane in a wedding celebration, as there is always the possibility of the plane getting excited too, and throwing a couple of shoes.

* * *

About a week ago the air liner "Flying Scotsman" won a race from London to Edinburgh by only a quarter of an hour from the train "Flying Scotsman," the plane making two stops and the train none,—confirming the well-established belief that the Scotch races are close.

* * *

The State Agriculture Departments of Nevada and Oregon have decided that the airplane has proved itself to be of great value to the farmers of those states, sending out announcements to that effect in the newspapers. We can add similar testimony on behalf of the farmers in New York State, particularly those on Long Island. Most of them were never able to show a profit at all until the recent boom in aviation struck, and all of the new flyers began to have forced landings in their potato patches and corn fields, at about one hundred dollars per landing.

* * *

A new sight-seeing service has opened up in New York city using Ireland flying boats. The passengers are taken for a tour of the harbor including a circle around the Statue of Liberty, after obtaining their tickets at the usual theatre ticket agencies. So don't be surprised if on your next visit to New York a ticket speculator sidles up to you and offers two on the aisle, only two rows back of the pilot.

* * *

As the Bunkless Political Party, sponsored by *Life*, has for its candidate for president, Mr. Will Rogers, the famous Ambassador Without a Portfolio, and Aeronautical Envoy Extraordinary, we'd like to put in a good word for him. He has been preaching and practising travel by air for years now, and some share of the present boom in aviation must be credited to him. In a recent announcement of his platform planks we find "We're going to eliminate Party Leaders, Slogans, Boll-Weevil, Luncheon Clubs, Vice Presidents, Sand Fleas, Conventions, Golf Pants, and Lots of Other Things." If Mr. Rogers will include among the Other Things for elimination the publicity seekers who are presently roosting and squawking on some of aviation's dead limbs, and the editors with the complex for horrible but imaginary details of the crash, we can promise him at least 10 votes. We'd like to promise more, but as it is we may have to repeat a couple of times ourselves, as we have found only seven people so far who will admit they read this column.

* * *

Mr. George A. Wies, Inc., tells us that he had a few bad moments the other day when he was talking to several customers and another customer, who is a close friend, came in the office and started pounding the desk, "You're a crook," he said, "and I want my money back." "Why, what's the matter?" asked George. "It's that parachute you sold me yesterday. I just jumped with it from 10,000 ft. and it didn't open at all."

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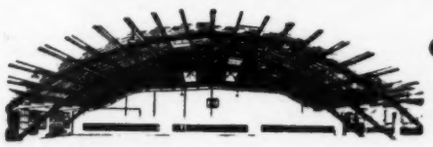

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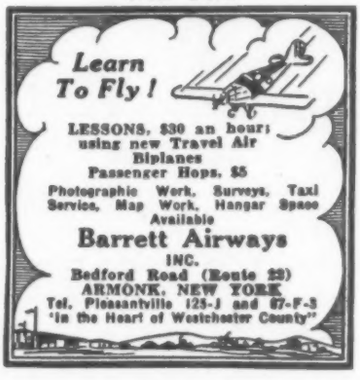

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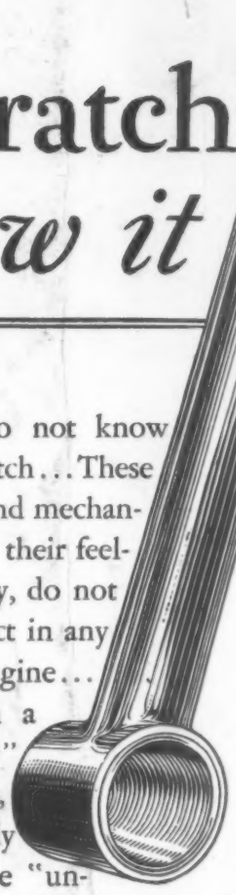
Tulsa **Oklahama**

A scratch means – "Throw it away!"



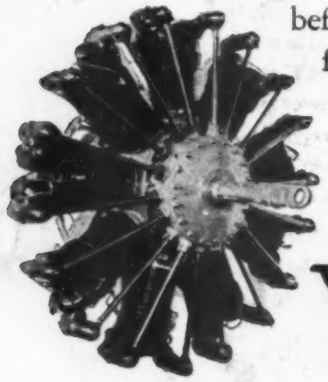
WRIGHT Workmen do not know how to "fix" a scratch... These men, whose high technical and mechanical skill is supplemented by their feeling of personal responsibility, do not know how to remedy a defect in any finished part for a Wright engine... Their only comment when a flaw is met is "throw it away" ...A scratch however slight, a defect visible perhaps only through a microscope, is the "unlocked door" toward which stresses in the metal might strain for release.

That is why visitors to the Wright plant see discarded finished parts—to the average eye perfect in every detail—but to the searching eye of a Wright inspector unfit for service.

Nothing is left to chance in building Wright engines. Every operation is done by an expert in that individual field; every operation is inspected by another expert, before the completed, perfected and approved parts are accepted for assembly...There is no secret behind the performance of Wright engines. Every part in the Wright engine bears the Wright name. Every part in the Wright engine is as important as every other part. Every part in the Wright engine is the individual product of specialized workmen who know that the slightest departure from the highest standard may wreck the whole.

Every part in the Wright engine is sound, solid, tested and retested, made from the start to be tougher than the service it must give, and built from rough stock to assembly with full knowledge of its important function in the completed engine. Exactly what Wright engines will do is known.

For more than a decade Wright has been building engines with just such care as this...to produce aircraft power plants that measure up to the highest standard of excellence...an unchanging policy which explains Wright engine performance. That is why "more pilots fly them".



Wright "Cyclone" Aeronautical Engine

That's why More Pilots fly them!

WRIGHT

WRIGHT AERONAUTICAL CORPORATION

Paterson, N. J., U. S. A.

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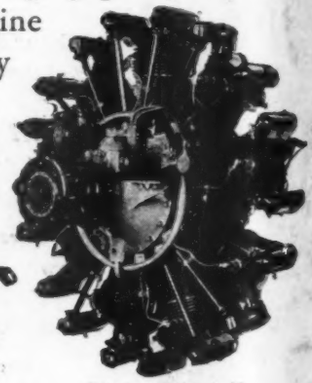

Wright "Whirlwind" Aeronautical Engine

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